Volume XIX Number 1

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# DISEASES
## *of the*
# NERVOUS SYSTEM

*A Practical Journal on Psychiatry and Neurology*

JANUARY 1958

1958

(CONTENTS ON PAGE 4)

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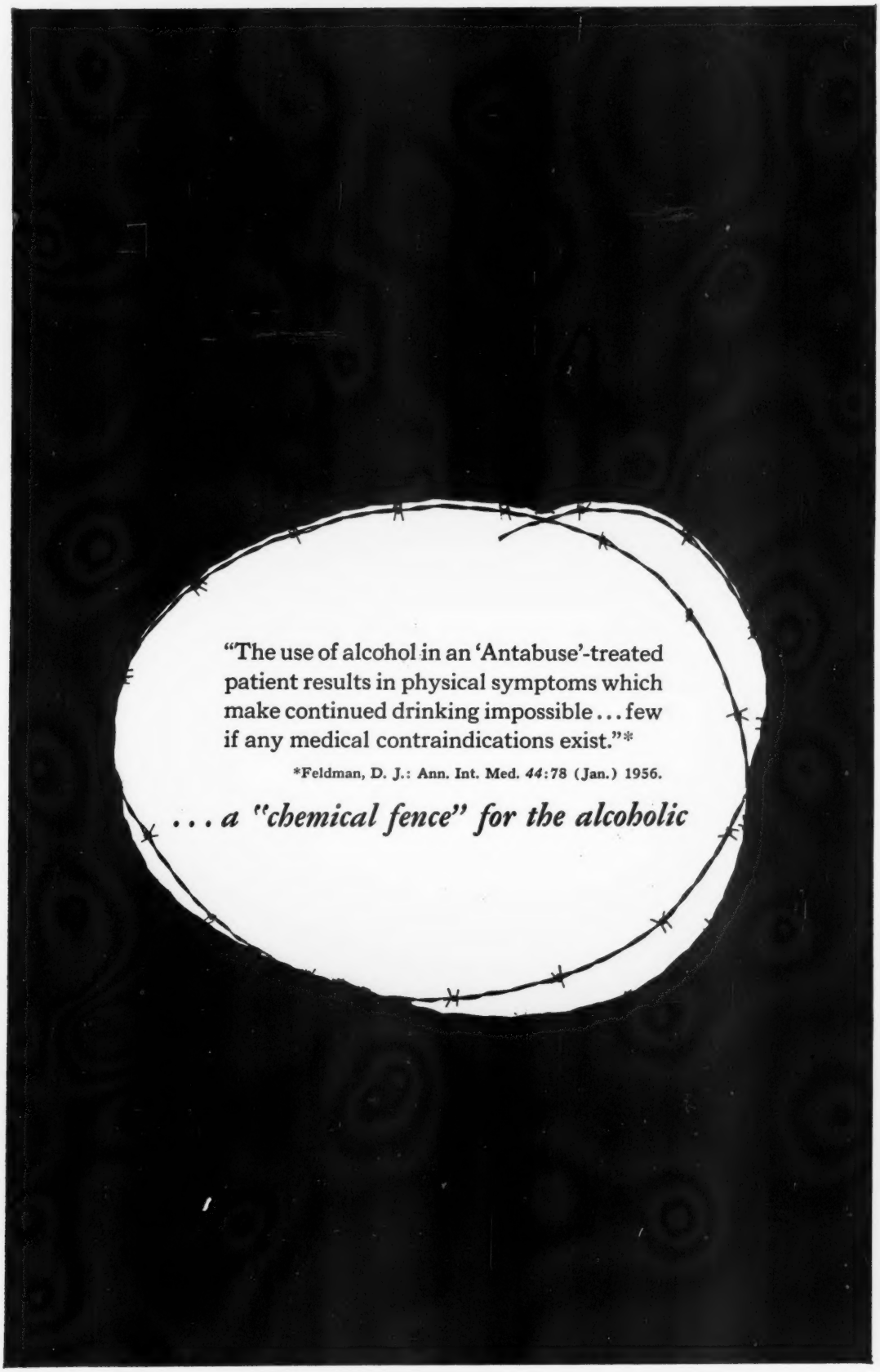
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# DISEASES *of the* Nervous System

## Contents

FRONTAL LEUCOTOMY AND ITS CONGENERS ..... 11
Walter Freeman

INCONTINENCE ON A CLOSED WARD ..... 15
J. L. Cameron and Betty Griggs

CHLORPROMAZINE IN TREATMENT OF CHRONIC SCHIZOPHRENIA ..... 20
Julian Abrams

A COMPARATIVE STUDY OF MODIFIED AND UNMODIFIED ELECTRIC SHOCK TREATMENT ..... 29
Leston L. Havens

FRIEDREICH'S ATAXIA ASCRIBED TO TRAUMA ..... 35
Jacob H. Friedman and Alberto Arengo

BOOK REVIEWS ..... 36

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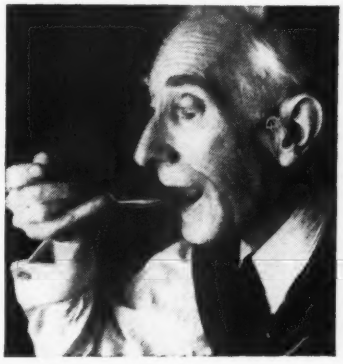

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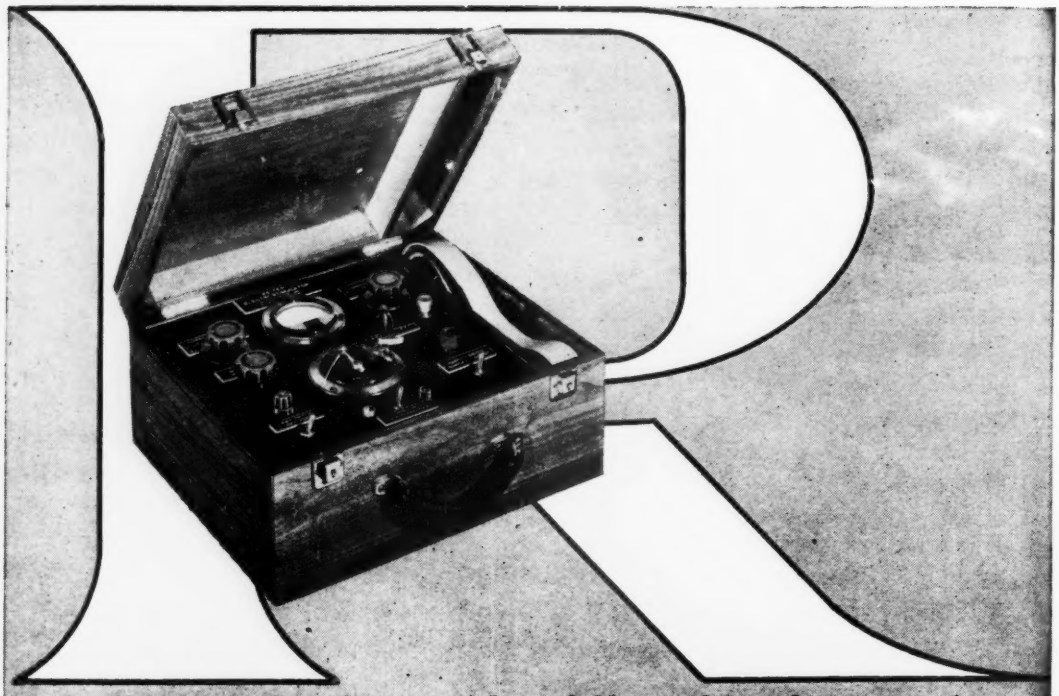

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DISEASES *of the* Nervous System

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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# Frontal Leucotomy and its Congeners

WALTER FREEMAN, M.D., PH.D.

Many attempts have been made to find the ideal operation for relief of mental suffering. Operations on the frontal lobe are far more likely to be followed by good results than operations on the other parts of the brain. The earliest attempts at psychosurgery consisted in ablations from the temporal and parietal lobes as reported by Burckhardt in 1890.[5] This may still prove to be the favored location for the suppression of hallucinations. Temporal lobectomy has been employed particularly for the relief of psychomotor attacks, in which hallucinations are sometimes prominent. The small series of amygdaloidectomies carried out by Williams and me[11] has yielded interesting results, but mainly in patients with organic basis, and this has been confirmed by Velasco-Suárez.[37] Parietal leucotomy as reported by Yahn,[41] temporal leucotomy as reported by Obrador Alcalde,[26] and occipital leucotomy in one case by Torkildsen[36] have been unsuccessful. Thalamotomy, either by the open approach or by the stereotaxic method of Spiegel[34] and others has had limited success in psychiatric conditions, although the interruption of the thalamofrontal pathway at its origin does produce striking changes.

The large extent of the frontal lobe gives the surgeon a massive area for his explorations. In the early days of leucotomy tentative operations by destroying small portions of the white matter, either by alcohol injections or by cutting cores in the white matter sometimes gave brilliant results, but often these were temporary, and the operations had to be repeated and extended. With the passage of time the operations became more extensive until the limits of tolerance had been passed. Then the devastating effects of leucotomy appeared, and brought about so many harmful reactions that the operation was severely criticized. These operations reached their peak in the so-called radical lobotomy of Freeman and Watts[10] in which the frontal lobes were almost completely severed back to the tuberculum sellae. With occasional misplaced incisions even farther posterior, the fatality rate rose to intolerable heights, and the personality deficits were so severe that this type of operation was abandoned. There are limits, even in the deteriorated schizophrenic patient, that cannot be overstepped with profit. Too limited an operation is useless, too extensive an operation is ruinous. The effective operation has to be such that just enough of the frontal lobe is disconnected, and not too much. How much can safely and effectively be discontinued, however, varies with each patient. Thus, granted that the patient has a malady of the type that will respond to leucotomy, the placement of the lesions is of major importance.

Since it is now recognized that emotional deterioration is an effective block to success in leucotomy, many patients are excluded from consideration, and the remainder are subjected to a modified leucotomy that has brought a greater number of restorations to productive existence. The number of modified operations is large. Many teams of surgeons and psychiatrists have attacked the problem, and many names have been given to the operative procedures. The frontal lobes may be approached from above, from the side, or from below. Fiamberti's suggestion of the transorbital approach dates back to 1937,[7] but was not widely adopted until after the end of the war. Meanwhile, efforts were being made with rostral operations (McKissock)[20] comparable to the minimal procedure of Watts, with good results in selected patients. Bimedial lobotomy was proven effective by the Boston group;[27] orbital leucotomy was shown to be less damaging and more therapeutic than complete leucotomy. Cingulectomy[39] was based upon

the hypothesis that this area represented the cortical "center" for emotional expression. All of these operations sometimes produced good results, and little in the way of adverse personality reaction. On the other hand, many of the modified operations were followed by relapse and sometimes the repetition of the operation was followed by satisfactory results—but sometimes not. Pippard[28] has recently dealt with secondary operations and his findings agree with mine,[13] namley, that success may be achieved in about one-third of those patients re-operated upon.

The most ambitious project designed to establish the value of psychosurgery in the treatment of mental disorders was the Columbia-Greystone investigation[21] in which a large team studied the effect of ablation of various areas of the frontal lobes. Instead of severing subcortical connections, the surgeon resected various areas symmetrically from the frontal lobes by the procedure termed topectomy. Basing the procedure on the supposed architectonic areas of the frontal lobes (I say "supposed," since Bailey[3] and others are in considerable disagreement as to the validity of Brodmann's map), it was found that best overall results were derived from the removal of the frontal poles, comprising Areas 9, 10 and part of 46. Topectomy was adopted by LeBeau[17] who erected upon somewhat shaky foundations a full-scale morcellation of the functions of the frontal lobes and their modification by various resections, concluding with an almost minute description of the symptoms of the psychosis that could be relieved by localized operations. Tailoring the operation to the symptomatic picture presented by the patient, however, proved to be an *ignis fatuus,* and even the subsequent investigations by the Columbia-Greystone group produced much less in the way of confirming information in their second[22] and third[18] projects. Topectomy is a tedious operation, beset by chances of failure as well as increased incidence of postoperative epilepsy. Pool[29] now prefers incision from above of the basal medial quadrant of the frontal lobes.

Cortical undercutting was introduced by Scoville[32] as a method of preserving the cortex with its blood supply while at the same time severing the connections. Of the three approaches, orbital, medial and superior, Scoville appears to find best results in the orbital approach.

Unilateral lobotomy has been suggested as a means of reducing the affective charge of the neurosis or psychosis (as well as the suffering of unbearable pain), and has achieved significant success in the hands of Scarff[31] and others. However, the experiences of investigators in Boston[27] and San Francisco[31] who compared unilateral and bilateral operations showed that the unilateral operations gave inferior results. In a discussion concerning unilateral lobotomy the point was made that operations on the right frontal lobe gave better results than operations on the left frontal lobe. Theoretical considerations were expressed, but the answer that I proposed was an unexpected one, namely, that most surgeons were right-handed. I have in my files two instances in which it was proved by necropsy that the surgeon in making his incision into the right frontal lobe had unknowingly penetrated the corpus callosum and produced significant lesions in the left frontal lobe. Since it has been rather amply demonstrated that unilateral frontal lobe excisions produce little in the way of alteration in the symptoms of the patient, either a tumor bearer or a psychotic, the explanation for the occasional success of unilateral frontal leucotomy may lie in the production of bilateral lesions. Before this theory is established, however, the effect of quantitative aspects must be evaluated, and further pathologic studies brought to bear on the question. The extensive studies of Meyer and Beck[23] indicate that quantity rather than topography is of major importance in the success of leucotomy. Few of their patients, however, had been restored by operation to effective social existence out of the hospital.

The injection of various substances into the frontal lobes deserves similar critical study. It will be recalled that the original operations by Moniz and Almeida Lima[24] consisted of the injection of alcohol into the frontal white matter. Italian investigators tried blood, formalin and even endocrine products, but the favored substance has been novocain, either as the base (Putnam),[30] or

as a solution (Nuisen and Grant),[25] and Abély and his co-workers.[1] Diffusion of the local anesthetic was thought to interrupt temporarily the pathways of the frontal lobe and help predict the effects of surgical interruption. This method has pitfalls, not only clinically but also pathologically. In my experience with a few patients the injection of novocain hydrochloride has been fleetingly successful in relieving distress, but so fleetingly that the patient forgot about the relief, and remembered only that the procedure left him no better off in the days following, and therefore failed to return for a repetition of the procedure. The anatomic effects of such injection have received scant attention, but cysts have been reported[40] in the white matter following the injection of a solution of novocain. The proponents of this method should attempt to confirm their results by injection of an inert substance, say normal saline. I believe that the effects of the injections will be found more closely related to the amount of the material injected and the force used than to the particular substance employed. Recently Grant[15] has reported success in pain cases but not in mental disorders.

Transorbital leucotomy has aroused much criticism by neurological surgeons, but those who have adopted it find it simpler and safer than the major operations, and equally effective. Fiamberti who originally proposed it reported some 500 operations with a mortality of 0.5%.[8] Anatomic studies have shown that it is more accurate than even the open leucotomy. Follow-up studies have shown that undesirable sequels (epilepsy, obesity, incontinence) are reduced from 20% to 1%,[12] and that the syndrome of frontal lobe deficit, which Watts and I observed in 10% of our prefrontal patients, is confined to 0.5%, that is, in those patients experiencing non-fatal operative hemorrhages in both frontal lobes. The most serious objection to transorbital leucotomy, which was apparent when I presented the subject before the Royal Society of Medicine in 1949,[9] seems to be the esthetic aspect. Since the interests of the patient are best served by the least damaging operation, the neurological surgeons should examine the procedure more dispassionately. Some have adopted a dog-in-the-manger attitude, saying to the psychiatrist, in effect: "I won't and you shan't." Fortunately, this attitude is becoming less fixed than it was in earlier years. Watts[38] now uses the transorbital approach almost exclusively.

Electrocoagulation of the white matter of the inferior medial quadrant has been devised by Grantham[16] to produce selective lesions with minimal danger. The procedure is carried out under roentgenologic control and has achieved satisfactory results according to Ayd.[2] The operation is repeated one or more times in certain cases. The extent of destruction is variable even though placement of the electrodes is accurate. The procedure is too recent to permit adequate clinical or anatomic studies that would establish the superiority of this procedure over others with a longer period of performance behind them. A similar procedure, under stereotoxic control, is being employed to place lesions accurately in the thalamofrontal radiation.[4]

Lindstrom[19] produces lesions in the subcortical white matter by ultrasonic waves. The transducer is fitted snugly to the dura and the current turned on, generating vibrations at the rate of a million per second. The use of multiple transducers[14] can catch a pinpoint area in a cross-fire of energy that is destructive while leaving the superficial portion intact. As used clinically, however, and this is a rather new method, a single instrument spares the cortex but produces necrotic lesions in the white matter that are most extensive just beneath the area of application. Since it is not yet feasible to apply the transducer to the medial and inferior surfaces of the frontal lobes, this method must await further exploration. Its safety is assured; its effectiveness is still to be determined, and its applicability on a large scale to patients with mental disorder is somewhat remote. Thus far this method has been employed almost solely for the relief of suffering in patients in the terminal phase of malignant disease.

Thermocoagulation of the exposed cortex and ligation of the veins as they enter the sagittal sinus over the frontal lobes have been reported in the second Columbia-Greystone Project[22] as either dangerous or ineffective or both and have been abandoned.

Direct attack upon the thalamus either by the open approach or by the stereotaxic method has proven of doubtful value in patients with schizophrenia, and the time-consuming nature of the operation gives little hope that it can be widely employed in the treatment of mental disorders. Spiegel and his associates,[35] on the basis of 56 schizophrenic patients subjected to thalamotomy found five recovered and seven definitely improved. "Combinations of frontal lobe and thalamic operations were successful in about one-half of the cases in which either of these operations failed to improve the emotional disorder." Disturbances in orientation and in memory, which occurred in 23 of 30 cases minutely observed, might last for days or weeks and even as long as a year. The paper gives a rather formidable list of complications, and four deaths.

Recognizing the importance of the reticular activating system. Heath and his coworkers[16a] stimulated the cephalic end in or near the septal nuclei by means of implanted electrodes. They observed arousal, especially in catatonic patients. Other patients showed variable degrees of improvement. One to three years later nine of 22 patient were out of the hospital.

Similar arousal phenomena were reported by Feldberg and Sherwood[6] after intraventricular injection of drugs, though the improvement was temporary. Sometimes adrenalin produced fleeting contact in catatonics but rendered them more liable to impulsive behavior.

With the numerous operative procedures described above, it would seem that after maybe another twenty years the choice would narrow down. But since surgeons are by nature inventive, it seems more probable that additional measures for producing lesions in various areas will be described. The really remarkable thing, however, is that every described operation can be counted upon to produce exactly the proportion of responses that Moniz reported in his first monograph in 1936, one-third recovered, one-third improved and one-third unimproved. Results are better or worse depending more upon the choice of the patient and less upon the choice of operation.

Los Altos, Calif.

*REFERENCES*


1. Abély, P., and Guyot, P.: La place et la portée des injections médicamenteuses intracérébales comparativement aux interventions mutilantes aux infiltrations novocainiques du cerveau. *Presse méd.*, 62: 1475, 1954.
2. Ayd, F. J.: The Grantham Lobotomy for the Relief of Neurotic Suffering. *Dis. Nerv. Syst.*, 17: 132, 1956.
3. Bailey, P.: Concerning Cytoarchitecture of the Frontal Lobe of Chimpanzee and Man. *Research Publ. A. Nerv. & Ment. Dis.*, 27: 84, 1947.
4. Benincasa-Stagni, E.: La stereotassia in psicochirurgia. *Riv. sperim. de freniat.*, 79: 500, 1955.
5. Burckhardt, G.: Über Rindenexcisionen als Beitrag zur operativen Therapie der Psychosen. *Allg. Ztschr. f. Psychiat.*, 47: 463, 1890-91.
6. Feldberg, W., and Sherwood, S.: Recent Experiments with Injections of Drugs Into the Ventricular System of the Brain. *Proc. Roy. Soc. M.*, 48: 853, 1955.
7. Fiamberti, A. M.: Proposta di una tecnica operatoria modificata e semplificata per gli interventi alla Moniz sui lobi prefrontali in malati di mente. *Rass. Studi psichiat.*, 26 (2): 797, 1937.
8. Fiamberti, A. M.: Metodi psicochirurgici e rispetto della personalità umana. *Riforma med.* #21, 1954.
9. Freeman, W.: Transorbital Leucotomy: The Deep Frontal Cut. *Proc. R. Soc. Med.*, 42 Suppl. 8, 1949.
10. Freeman, W., and Watts, J. W.: Psychosurgery, 2 ed. Springfield, 1950, *Thomas*, p. 43.
11. Freeman, W., and Williams, J. W.: Human Sonar. The Amygdaloid Nucleus in Relation to Auditory Hallucinations. *J. Nerv. Ment. Dis.*, 116: 456, 1952.
12. Freeman, W.: Hazards of Lbootomy. *J.A.M.A.*, 152: 487, 1953.
13. Freeman, W.: Frontal Lobotomy 1936-1956. A Follow-up of 3000 Patients from One to Twenty Years. *Am. J. Psychiat.*, 113:877, 1957.
14. Fry, W. J.: Ultrasound in Neurology. *Neurology*, 6: 693, 1956
15. Grant, F. C.: Personal Communication, September 1956.
16. Grantham, E. G., and Segerberg, L. H.: Experiments with Frontal Lobotomy. *Am. Surgeon*, 22: 242, 1956.

16 a. Heath, R. G., ed.: Studies in Schizophrenia. Cambridge, Mass., 1954. *Harvard Univ. Press.*

17. LeBeau, J.: Psycho-chirurgie et fonctions mentales. Paris, 1954, *Masson.*
18. Lewis, N. D. C., Landis, C., and King, H. E.: Studies in Topectomy. London, 1956. *Grune & Stratton.*
19. Lindstrom, P.: Prefrontal Irradiation—A Substitute for Lobotomy. *Arch. Neurol. & Psychiat.*, 72: 399, 1954.
20. McKissock, W.: Recent Techniques in Psychosurgery. *Proc. R. Soc. Med.*, 42 Suppl.: 13, 1949.
21. Mettler, F. A., ed.: Selective Partiai Ablation of the Frontal Cortex. New York, 1949, *Hoeber.*

22. Mettler, F. A., ed.: Psychosurgical Problems. Phila., 1952, *Blakiston.*
23. Meyer, A., and Beck, E.: Prefrontal Leucotomy and Related Operations. London, 1954, *Oliver & Boyd.*
24. Moniz, E., and Almeida Lima, P.: Premiers essais de psychochirurgie; technique et résultats. *Lisboa méd.,* 13: 152, 1936.
25. Nulsen, F. E., and Grant, F. C.: Relief of Pain in Advanced Carcinoma by Prefrontal Injection of Procaine. *Arch. Neurol. & Psychiat.,* 69:653.
26. Obrador Alcade, S.: Temporal Lobotomy. *J. Neuropath. and Exper. Neurol.,* 6: 185, 1947.
27. Paul, N. L., Fitzgerald, E., and Greenblatt, M.: Five-year Follow-up of Patients Subjected to Three Different Lobotomy Procedures. *J.A.M.A.,* 161: 815, 1956.
28. Pippard, J.: Second Leucotomies. *J. Ment. Sc.,* 101: 788, 1955.
29. Pool, J. L.: Personal Communication. Oct. 1956.
30. Putnam, T. J.: Procaine Base in Iodized Oil Introduced transorbitally as a Test for the Effects of Lobotomy. *Tr. Am. Neurol. Ass.,* 75: 125.
31. Scarff, J. E.: Unilateral Prefrontal Lobotomy for the Relief of Intractable Pain and Termination of Narcotic Addiction. *Surg. Gyn. & Ob.,* 89: 385, 1949.
32. Scoville, W. B.: Recent Trends in Lobotomy. *Acta Neurol. Latinoamer.,* 1: 353, 1955.
33. Sem-Jacobsen, C. W., Petersen, M. C., Dodge, H. W., Jr., Lynge, H. N., Lazarte, J. A., and Holman, C. B.: Intracerebral Electrographic Study of 93 Psychiatric Patients. *Acta Psychiat. et Neurol. Scand.,* Suppl. 106: 22-26, 1956.
33 a. Simon, A., Margolis, L. H., Adams, J. E., and Bowman, R. M.: Unilateral and Bilateral Lobotomy. A Controlled Evaluation. *Arch Neurol. & Psychiat.,* 66: 494, 1951.
34. Spiegel, E. A., and Wycis, H. T.: Stereoencephalotomy. Thalamotomy and Related Procedures. New York, 1952, *Grune & Stratton.*
35. Spiegel, E. A., Wycis, H. T., Freed, H., and Orchinik, C. W.: A Follow-up Study of Patients Treated by Thalamotomy and by Combined Frontal and Thalamic Lesions. (In press.)
36. Torkildsen, A.: Notes on the Importance of the Occipital Lobes in a Case of Schizophrenia; Experience with a Case of Bilateral Occipital Leucotomy. *Acta psychiat. et neurol.,* 24: 701, 1949.
37. Velasco-Suarez, M.: Correlaciones fronto-temporales. Leucotomias y amygdaloidectomias. *I. Conf. Méx. de Neurol. quirug. y Psico-cirurgia.* Mexico, 1952. Editorial Progreso, pp. 37-79.
38. Watts, J. W.: Personal Communication.
39. Whitty, C. W. M.: Effects of Anterior Cingulectomy in Man. *Proc. R. Soc. Med.,* 48: 463, 1955.
40. Whitworth, J. M., Weinberger, L. M., Zimbler, M. B., and Paolino, A. F.: The Use of Frontal Lobe Procaine Injections in the Treatment of Mental Disorders. *Ohio M. J.,* 52: 727, 1956.
41. Yahn, M., Mattos Pimenta, A., and Sette, A. Jr.: Leucotomia parietal; resultados en 22 pacientes. *Arq. neuro-psiquiat.,* 6: 225, 1948.

# Incontinence on a Closed Ward

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*Introduction*

With the increasing application of psychoanalytic techniques to the resolution of the psychoses, considerable advances are being made in the understanding of the psychologic processes of people suffering from these clinical states. There has developed a vast literature on this subject, from the works of Federn, an early pioneer, to the more recent works of Sechehaye and Fromm-Reichmann. Reading the reports of these writers one is struck by the frequently divergent theories concerning the nature of the therapeutic process. However, all these workers pay some attention to the organization of the immediate life situation of the patients. This factor is perhaps thrust on the psychotherapist working with schizophrenics as the severity of the disturbance frequently leads to hospitalization and part of the therapy at least is conducted in a hospital setting.

Among the leading writers in the field Federn pays most attention to the organization of the current relationships of his patients. He emphasizes the importance of bodily care emphatically in this quotation:

"No physician can cure any severe case when bed rest and care are lacking, or when, intentionally or not, antagonisms develop toward the task of bringing back the psychotic ego to normality and reality. Experience must be drawn, and conclusions made, from patients treated under the best conditions and with the least opposition."

Such specific statements are read and considered carefully by thoughtful psychiatrists throughout the world and there has been considerable interest aroused in the general care and nursing requirements of chronic schizophrenic patients. A new type of ex-

From Chestnut Lodge, Rockville, Maryland.

perimental situation has been studied in which sociologists and allied scientists observed the daily life in wards of mental hospitals and then combined their specialized skills with that of the hospital in an attempt to add a further perspective to our appreciation of the complicated human reaction called schizophrenia.

Among these studies one in particular merits attention here. It is the investigation carried out by Stanton and Schwartz and presented in their book "The Mental Hospital." This fruitful study produced many interesting publications, among them a paper written by a nurse, Gwen Tudor, which is devoted to a study of the problem of mutual withdrawal between patients and staff on a disturbed ward. In the course of this article Tudor introduces the concept of the influence of what has been loosely referred to as "hospitalization." However, Tudor is quite specific in this article in indicating at least some of the factors whereby the environment may subtly and insidiously act to prolong the patient's illness. She states:

> "Although a particular nurse may establish effective and satisfactory relations with a patient, this can be easily undone by what others do with the patient, by the formal and informal social structure on the ward which tends to maintain the patient in his mental illness, by the interpersonal relationships amnog the staff members, and by the general institutional context which orders and forbids certain activities. The social context within which the patient lives is that pattern of interpersonal relations which is the network of reciprocal activities of all those on the ward. It is this social context which both determines in large part the nurse's attitudes and modes of behavior and also facilitates or deters the patient's mental health."

Tudor later makes clear her view that many of the stereotyped descriptions applied to patients, e.g., assaultive, hopeless, or unable to tolerate closeness, are but convenient rationalizations for avoiding contact with the patient and so fostering schizophrenic isolation.

The type of phenomenon described by these workers and by those who have followed in the field are characteristic in the general sense of life on all units which contain disturbed patients. Although from hospital to hospital there is variation in their nature, problems of the type described by them and described in the present paper, are universal in mental hospitals—certainly in Britain and in this country. However, the hospital which investigates and attempts to interfere actively in such group processes requires of all the people who form its staff an ability to question themselves about the way in which they pursue their work—in particular it requires that they question even the modes of behavior accepted as part of the traditional professional role. While doing this, considerable anxiety is bound to be aroused in the staff group, but this group must be sufficiently cohesive and insightful to avoid group disruption and meantime continue to pursue its main goal—the welfare of the patients.

In the majority of such studies the authors concentrated on the socio-dynamics or group processes of the unit concerned. These were frequently of highly complex nature. The tensions between staff and patients were carefully delimited and their causes studied. This paper avoids close study of this area, largely because of lack of adequate data collection. It is instead merely a description of a routine administrative investigation of an event on a closed ward for disturbed female patients, the majority of whom were suffering from schizophrenia and had suffered from the condition for a number of years. The initial incident occurred some eight months ago, and the authors would like to emphasize that up to the moment they have not succeeded in intervening so as to change the underlying pattern which was partly responsible.

### *Clinical Material*

The clinical information contained in this section was obtained from a variety of sources: (1) observations of the charge nurse; (2) observations of the administrator; (3) the formal weekly ward staff meeting; (4) informal discussions with the ward staff on duty; (5) informal discussions with various members of the hospital staff during the casual or routine encounters of a working day.

The particular incident which provoked the investigation occurred as follows: One day three patients were reported as suffering from incontinence of urine. Although

two of the three occasionally had been incontinent before when particularly upset, the third had never demonstrated this feature previously. Furthermore, as the patients were all incontinent within a period of an hour, it seemed that the events might well have a common cause.

At the time when the incident occurred the ward was passing through a difficult time. Both administrator and charge nurse had recently arrived in the hospital and were to all other members of the ward group an unknown quantity, particularly as many of their spoken and unspoken attitudes indicated something of a change of emphasis from a previously well-established pattern. Accordingly, there was a good deal of disturbance with a heightening of many of the symptoms normally present among the various indivdiuals. This had led to an increased difficulty in communication between staff and patients. These two groups were, culturally, quite distinct.

When inquiries were made about the incident, one of the first pieces of information which was elicited was the fact that the lavatory doors were kept locked permanently. When a patient wished to use the toilet room, it was necessary for her to approach a staff member and communicate this need. On the day in question the three patients had, for some reason, not been able to inform the staff of their discomfort. Although it was difficult to reconstruct the situation, it appeared that the three patients had been either mute or particularly obscure in their speech. However interesting one might consider the social implications of the isolation involved in this social situation, this paper pursues a more mundane aspect of the problem—in fact, why were the lavatory doors locked.

It emerged that the doors were locked because one patient, Molly, was in the habit of putting various articles, e.g., underwear, towels, or any ward accessory within reach, into the lavatory. At regular intervals this led to flooding, not only in the lavatory of the ward, but also on the lower floors and even the kitchen. A not unimportant fact was that offices occupied by senior members of the medical staff received a fair quota of water. Furthermore, the echelon of hospital staff concerned with general housekeeping had to deal with extra costs involving the expense of cleaning out the sewage system and the costs of redecorating wet and damaged walls. This, of course, led to a certain amount of pressure on the nursing staff of the ward to do something about the situation. The solution to the problem which was reached was the one already described—the lavatory doors were locked. This compromise became part of the fixed ward policy. Many members of the staff did not know why the doors were locked and it usually emerged that the possibility of discomfort for the patients as a result of this apparent solution of the dilemma was not openly considered. When asked about it, they clearly felt as though they were under fire in some way. They had the feeling, quite well-based, that one way or the other, they would be held responsible.

Of some interest is the fact that locking the doors had not really dealt with the problem, for Molly still managed to block the toilets—the staff had not taken the step of supervising her during visits to the room. This fact gave an opportunity to study something of the factors provoking what was not a highly stereotyped situation. The key to this lay in the design of the ward, for the flushing mechanism for the lavatory used by Molly was operated by a chain which was located inside the nursing station. A patient utilizing the lavatory had to request a staff member to work the flushing mechanism for her. The staff observed this situation carefully in the hope of being able to notice which particular staff member Molly asked to do this for her. From this it was hoped to get a lead as to why Molly blocked up the sewage system.

It was noticed that Molly was quite indiscriminate in her approaches to the staff for this reason normally, but on the whole, certain staff members were more frequently used as stooges to cause flooding. Each particular incident when she put something in the toilet was preceded by some demonstration of annoyance on her part. This annoyance seemed to be aroused by a particular situation, i.e. when a staff member refused to comply with one of her requests without

explanation, or else complied with covert irritation.

Molly shared a room with a patient who had a great reputation for personal assaultiveness. None of the female nurses or aides would go into the room when Mary, the patient in question, was there. She usually was there, as her presence on the hall aroused great anxiety. Accordingly, it was often difficult for the staff to accede to Molly's requests which frequently involved entering a room containing an individual who they were sure would attack them. A typical incident which was observed was as follows: It had been noticed that the incidence of flooding was higher on the evening shift than on the day shift and accordingly one of the authors spent some time there in the evening. One day on entering he noted that Molly was somewhat querulously saying to one of the staff members, "But I told you, Poppy, to bring me my blue slippers." Poppy, the aide, was standing at the door of the room shared by Molly and Mary, looking uncomfortable and afraid. As she hesitated at the door, Molly turned livid and began to hum and wave her little finger—a sure sign that she was very angry. Not long afterwards she asked to be let into the lavatory and when she came out, made certain that it was Poppy who pulled the chain in the nursing office. Flooding occurred and a bra and a towel were later taken out of the toilet.

The fear of attack by Mary was so general among the staff that it also merited attention. Much of it was founded on actual daily experience of attacks. However, most of the nurses stated that they found her appearance "animal-like" and her practice of screaming incoherently, terrifying and subhuman. Discussion with them revealed that some time previous she had made a violent attack on the nurse who was at that time in charge of the ward. From that date it had become a ward order that no female nurse should go into Mary's room alone. This, of course, made more difficult attempts to look after Molly.

In order to make any intervention in the flooding situation, it was necessary first to intervene in the situation with Mary. The necessary mechanisms to deal with this situation were part of the hospital tradition and culture. Accordingly, the situation was discussed at the formal weekly staff meetings, and informally in the ward. The group support for the individual increased and the great fear which Mary felt about the staff became appreciated. Her low self-esteem was understood, and the nurses began to take steps in terms of her physical care to counteract this. She ceased to be the terror of the ward.

As the investigation proceeded, the incidence of blocking of the toilets diminished. Molly was receiving a special degree of attention as a by-product of the work, but no special steps were taken beyond the ones being instituted in the ward in any case. After two months the activity almost stopped —and actually did so for a period of a month. Later it began again and still is a problem. At this time the morale of both authors (charge nurse and administrator) was flagging and they were falling back on the previous patterns of dealing with situations. For a time they passed through a period of doldrums familiar to most people who have worked with groups. This period is now passing. It is clear now in retrospect that the staff group in general felt that Molly was too demanding. The nurses would at times become physically tired out through fetching and carrying the multitudinous tasks she imposed. The administrator and charge nurse had not utilized the channels available to them and brought the difficulty up for discussion so that the situation could be clarified and appropriate action taken. Their tacit acceptance of the label "too demanding" had left the nurses to deal as best they could with Molly, with the inevitable result that resentment grew and the patient reacted to it according to a well established pattern. It is only now that the meaning behind the demandingness is being sought, with hope of success. The blocking is already rapidly diminishing.

### *Discussion*

The description given above of an administrative investigation necessarily touches only superficially on the complex social situation in which the patients were living. It is not the authors' intention, moreover, to imply a simple causality behind the descrip-

tion of the few related phenomena which they have given here. They do feel, however, that the account that they have given of a routine administrative-nursing task has some interesting implications which merit consideration.

The first of these is to realize that there are many ways of viewing the people on a ward. They can be divided in terms of roles into various social strata—a patient group, nursing group, doctor group, etc. However, they can also be viewed as a unitary group, reacting to each other, and to others outside the arbitrarily delimited group, and maintaining the free-floating group anxiety at a minimum by various maneuvers which are the group equivalent of an individual's defense mechanisms. With the passage of time their defensive maneuvers become part of a group behavior pattern as a state of stasis is achieved which holds the original anxiety in check so that the group members may well forget it as they go about their daily living. Disturbance, or investigation, of these patterns tends to reactivate the anxiety inherent in the masked situations.

Secondly, the solution of the problem which is achieved may well cope with the anxiety aroused but, just as in the case of the pathological defenses of the individual, it merely masks and does not answer the central problem from which the group anxiety has sprung. In this case the locking of the doors merely gave a legalistic argument to the effect that "something was being done." In itself it was an illogical solution of the problem, failing to prevent the activity which was undesirable, and causing the development of a further series of phenomena—one might call these secondary group symptoms. Some of these were derived from the socio-psychological significance of the action, with some heightening of the intergroup tension. These have not been described. However, the more important factor for the purpose of the present investigation was the fact that the patients had a new area of necessary communication set up between themselves and the key-possessing members of the ward group—namely, the nursing personnel. As has often been indicated in the literature of schizophrenia, interpersonal communication is a major difficulty for the schizophrenia patient. It is also a sensitive indicator of the tension which the patient feels, so that when he becomes more anxious his ability to communicate usually deteriorates. When tension on the ward in question rose, then the patients who now had the problem of informing the staff of their need to visit the toilets, could find themselves in the situation of the three patients who were incontinent. The patient members of the ward group were accordingly placed in a situation in which they could be expected to be vulnerable.

The third point which the authors wish to indicate is the extent to which the investigation involved not only members past and present of the ward group, but also people of the hospital at large—even, for example, the kitchen and housekeeping personnel, and the staff members whose offices were flooded. As the new charge nurse and administrator became integrated in the social structure, they, too, became participants in the perpetuation of this illogical solution in the manner described.

Out of it all, however, one particularly clear lesson has emerged for the authors, as administrator and charge nurse, apparently even with satisfactory facilities available to deal with just such situations as these, when one fails to make use of them through anxiety, disappointment, or for any other reason. As a member of the group, one fosters and prolongs the state of affairs which one wishes to alter.

# Chlorpromazine in Treatment of Chronic Schizophrenia

JULIAN ABRAMS, PH.D.

The vast amount of literature which the tranquilizing drugs have brought forth results, in part, from the enthusiasm evoked by any new and seemingly effective method of treatment of mental disorders. Yet, the efficacy of chlorpromazine is still a matter of unresolved discussion. Such an ardent advocate as Kinross-Wright,[13] who considers chlorpromazine superior to any of the established methods of treatment, is refuted in the same publication by Litteral and Wilkinson,[16] who believe that while chlorpromazine has its proper place, it is not a universal substitute for the conventional somatic treatment methods. Feldman *et al.*[7] point out that the reception accorded other drugs in the past was frequently enthusiastic but the ". . . changes produced by these drugs were a combination of enthusiasm, suggestion, auto-suggestion, improved techniques and altered regimes concomitant to test situations and intensive clinical evaluations," and that the results of chlorpromazine treat-

From Springfield State Hospital, Sykesville, Maryland.

TABLE I—*Mean Scores, Pre-*

| | *Chlorpromazine Group* | | | | | *Placebo Grou* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | MEAN SCORES | | | Standard | | MEAN SCORES | | | |
| | Pre-Treatment | Post-Treatment | Difference | Error of Difference | t | Pre-Treatment | Post-Treatment | Difference | I |
| WECHSLER-BELLEVUE | | | | | | | | | |
| Full Scale I.Q. | 90.78 | 95 28 | 4.50 | .91 | 4.95* | 85.81 | 90.06 | 4.25 | |
| Verbal I.Q. | 92.22 | 95 89 | 3.67 | 1.10 | 3.34* | 86.94 | 90.75 | 3.81 | |
| Performance I.Q. | 91.00 | 95.55 | 4.55 | 1.48 | 3.07* | 87.44 | 92.25 | 4.81 | |
| Information | 8.39 | 8.72 | .33 | .24 | 1.37 | 7.25 | 7.44 | .19 | |
| Comprehension | 6.00 | 7.00 | 1.00 | .62 | 1.61 | 5.44 | 5.69 | .25 | |
| Digit Span | 7.78 | 8.11 | .33 | .60 | .55 | 7.00 | 8.62 | 1.62 | |
| Digits Forward | 6.33 | 6.55 | .22 | .24 | .92 | 6.25 | 6.75 | .50 | |
| Digits Backward | 4.05 | 4.00 | — .05 | .32 | .16 | 3.62 | 4.25 | .63 | |
| Arithmetic | 5.66 | 5.44 | — .22 | .59 | .37 | 4.94 | 5.69 | .75 | |
| Similarities | 8.33 | 10.27 | 1.94 | .81 | 2.39† | 6.62 | 7.37 | .75 | |
| Vocabulary | 9.61 | 10.05 | .44 | .34 | 1.29 | 8.37 | 8.75 | .38 | |
| Picture Arrangement | 6.22 | 7.22 | 1.00 | .73 | 1.37 | 4.69 | 5.56 | .87 | |
| Picture Completion | 6.11 | 7.11 | 1.00 | .59 | 1.69 | 5.69 | 5.69 | 0.00 | |
| Block Design | 6.44 | 6.55 | .11 | .43 | .26 | 5.75 | 6.56 | .81 | |
| Object Assembly | 8.77 | 9.55 | .78 | .50 | 1.56 | 7.75 | 9.06 | 1.31 | |
| Digit Symbol | 5.72 | 6.61 | .89 | .54 | 1.65 | 5.37 | 5.87 | .50 | |
| RORSCHACH | | | | | | | | | |
| Anxiety | 12.16 | 7.94 | — 4.22 | 1.46 | 2.89* | 9.81 | 8.00 | — 1.81 | |
| Hostility | 7.00 | 3.72 | — 3.28 | 1.06 | 3.09* | 5.19 | 4.25 | — .94 | |
| MSRPP | | | | | | | | | |
| Morbidity | 47.67 | 26.00 | —21.67 | 3.55 | 6.10* | 41.75 | 39.31 | — 2.44 | |
| Factor A | 16.55 | 16.05 | — .50 | .69 | .72 | 13.50 | 14.69 | 1.19 | |
| B | 6.50 | 4.94 | — 1.56 | .42 | 3.71* | 5.69 | 5.62 | — .07 | |
| C | 8.39 | 5.39 | — 3.00 | .62 | 4.84* | 6.75 | 5.87 | — .88 | |
| D | 13.27 | 11.83 | — 1.44 | .57 | 2.53† | 12.62 | 12.31 | — .31 | |
| E | 15.33 | 13.50 | — 1.83 | .54 | 3.39* | 13.94 | 12.81 | — 1.13 | |
| F | 10.72 | 7.78 | — 2 94 | .76 | 3.87* | 10.37 | 10.06 | — .31 | |
| G | 15.39 | 10.50 | — 4.89 | .78 | 6.27* | 14.19 | 13.44 | — .75 | |
| H | 12.61 | 8.44 | — 4.17 | .63 | 6.62* | 11.12 | 10.50 | — 62 | |
| I | 9.72 | 9.67 | — .05 | .58 | .09 | 8.94 | 8.13 | — 81 | |
| J | 10.28 | 9.61 | — .67 | .35 | 1.91 | 8.94 | 9.56 | 62 | |
| K | 15.50 | 10.33 | — 5.17 | .79 | 6.54* | 14.44 | 14.19 | — 25 | |

*Significant at the .01 level. †Significant at the .05 level.

ment may be attributed to the same factors. In the light of the varied claims, Hall and Dunlap[10] take note of the failure of clinicians to conduct more carefully controlled studies of the therapeutic effects of the tranquilizing drugs.

For the most part, investigators have tended to rely mainly on clinical observation as their criterion of improvement. Some have used rating scales, either those informally composed for a given experiment or else the more reliably constructed, standardized scales. Relatively few, however, have utilized psychological tests to assess changes in personality. It was the purpose of this study to combine psychological tests with a rating scale to evaluate the effectiveness of chlorpromazine. Since reports favorable to chlorpromazine have claimed that the drug enhanced logical thinking, reduced anxiety and hostility, and made for improved overt behavior, these factors were selected for investigation. A chlorpromazine (experimental) group and a placebo (control) group were studied separately, pre- and post-treatment, and the two groups were compared, post-treatment, in regard to these factors. It was hypothesized that chlorpromazine was an effective palliative which would bring about improved intellectual functioning, reduce anxiety and hostility, and result in more satisfactory behavioral patterns as contrasted with the placebo group which would not show these effects.

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*, Pre- and Post-Treatment.*

*Group* — *Chlorpromazine and Placebo Groups*

| | | | *Pre-Treatment—Both Groups* | | | *Post-Treatment—Both Groups* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ence | Standard Error of Difference | t | Difference | Standard Error of Difference | t | MEAN SCORES Pre-Treatment | Post-Treatment | Difference | Standard Error of Difference | t |
| 25 | 1.53 | 2.78† | — 4.97 | 3.81 | 1.30 | 95.28 | 90.06 | — 5.22 | 4.09 | 1.28 |
| 81 | 1.43 | 2.63† | — 5.28 | 4.24 | 1.25 | 95.89 | 90.75 | — 5.14 | 4.05 | 1.27 |
| 81 | 2.07 | 2.32† | — 3.56 | 3.93 | .91 | 95.55 | 92.25 | — 3.30 | 3.99 | .83 |
| 19 | .19 | 1.00 | — 1.14 | .79 | 1.44 | 8.72 | 7.44 | — 1.28 | .80 | 1.60 |
| 25 | .42 | .59 | — .56 | .98 | .57 | 7.00 | 5.69 | — 1.31 | .80 | 1.64 |
| 62 | .37 | 4.38* | — .78 | .98 | .80 | 8.11 | 8.62 | .51 | .88 | .58 |
| 50 | .24 | 2.08 | — .08 | .36 | .22 | 6.55 | 6.75 | .20 | .40 | .50 |
| 63 | .18 | 3.50* | — .43 | .45 | .96 | 4.00 | 4.25 | .25 | .36 | .69 |
| 75 | .76 | .99 | — .72 | 1.19 | .61 | 5.44 | 5.69 | .25 | 1.15 | .22 |
| 75 | .64 | 1.17 | — 1.71 | 1.10 | 1.55 | 10.27 | 7.37 | — 2.90 | 1.15 | 2.52† |
| 38 | .26 | 1.35 | — 1.24 | .87 | 1.43 | 10.05 | 8.75 | — 1.30 | .75 | 1.73 |
| 87 | .63 | 1.38 | — 1.53 | .90 | 1.70 | 7.22 | 5.56 | — 1.66 | .86 | 1.93 |
| 00 | .61 | 0.00 | — .42 | .85 | .49 | 7.11 | 5.69 | — 1.42 | 1.09 | 1.30 |
| 81 | .48 | 1.69 | — .69 | .68 | 1.01 | 6.55 | 6.56 | .01 | .68 | .01 |
| 31 | .73 | 1.79 | — 1.02 | 1.06 | .96 | 9.55 | 9.06 | — .49 | 1.17 | .42 |
| 50 | .37 | 1.35 | — .35 | .76 | .46 | 6.61 | 5.87 | — .74 | .80 | .92 |
| 81 | 1.12 | 1.62 | — 2.35 | 2.21 | 1.06 | 7.94 | 8.00 | .06 | 1.76 | .03 |
| 94 | .82 | 1.15 | — 1.81 | 1.78 | 1.02 | 3.72 | 4.25 | .53 | .98 | .54 |
| 4 | 3.39 | .72 | — 5.92 | 3.87 | 1.53 | 26.00 | 39.31 | 13.31 | 4.57 | 2.91* |
| 19 | .80 | 1.49 | — 3.05 | 1.23 | 2.48* | 16.05 | 14.69 | | | |
| 97 | .35 | .20 | — .81 | .49 | 1.65 | 4.94 | 5.62 | .68 | .42 | 1.62 |
| 88 | .78 | 1.13 | — 1.64 | .99 | 1.66 | 5.39 | 5.87 | .48 | .90 | .53 |
| 31 | .54 | .57 | — .65 | .83 | .78 | 11.83 | 12.31 | .48 | .67 | .72 |
| 3 | 1.08 | 1.05 | — 1.39 | 1.26 | 1.10 | 13.50 | 12.81 | — .69 | .93 | .74 |
| 31 | .96 | .32 | — .35 | 1.11 | .32 | 7.78 | 10.06 | 2.28 | .97 | 2.35† |
| 5 | .91 | .82 | — 1.20 | .98 | 1.22 | 10.50 | 13.44 | 2.94 | 1.23 | 2.39† |
| 2 | .81 | .77 | — 1.49 | 1.19 | 1.25 | 8.44 | 10.50 | 2.06 | .97 | 2.12† |
| 1 | .45 | 1.80 | — .78 | .76 | 1.03 | 9.67 | 8.13 | — 1.54 | .73 | 2.11† |
| 2 | .35 | 1.77 | — 1.34 | .75 | 1.79 | 9.61 | 9.56 | — .05 | .55 | .09 |
| 5 | 1.01 | .25 | — 1.06 | 1.07 | .99 | 10.33 | 14.19 | 3.86 | 1.18 | 3.27* |

## Subjects

The subjects for this study were limited to white, female, hospital patients who were diagnosed schizophrenia, who had not profited from other therapies, and for whom the consensus of qualified psychiatric opinion was that they showed poor prognosis for recovery and discharge; that they were not feeble-minded and did not suffer from epilepsy, syphilis, or any demonstrable organic brain disease; that they were between the ages of 20 and 55 and had been hospitalized for a consecutive minimum period of two years. In addition, the patients had to be sufficiently cooperative so that psychological tests could be administered.

Forty female patients who met these requirements were selected and were divided, at random, into two groups of 20 each, one group receiving chlorpromazine (the experimental group), the other group receiving a placebo (the control group). During the course of the experiment several patients had to be eliminated from both groups for various reasons so that the final chlorpromazine group consisted of 18 patients while the final placebo group consisted of 16 patients. The groups, as constituted, showed no significant differences between the means in respect to age and length of hospitalization.

## Procedure

### *Administration of the Medication*

In order to obtain valid data pertinent only to the chlorpromazine and placebo, all other therapies were discontinued during the course of the investigation. Once a patient was selected for the study and the tests and scales were administered, medication was started and continued for four months.

The experimental group received chlorpromazine under the name of "Thorazine A." The drug was administered orally, under medical supervision, every six hours daily. For the first week, 50 mg. was administered at the given hour, a daily total of 200 mg. Thereafter, dosage was gradually increased to a maximum of 600 mg. daily, the amount varying for each patient depending upon tolerance and behavior. Of the 18 patients in the experimental group, seven received a maximum dosage of 600 mg. daily, while 11 received a maximum dosage of 400 mg. daily. All patients were on the maximum dosage for at least the last two months.

The second group, the control group, received a placebo, the same size, shape and color as the chlorpromazine. As a differentiation from the chlorpromazine, the placebo was known as "Thorazine B." It was administered in exactly the same manner as the chlorpromazine, starting with an initial dosage of 200 mg. daily for one week and then increasing to a maximum of 400 mg. daily.

Since chlorpromazine has been known to produce harmful side effects, laboratory and clinical procedures were conducted to avoid complications. These tests included: (1) blood count biweekly; (2) urine analysis weekly; (3) temperature, pulse, respiration and blood pressure daily. Although no harmful side effects were anticipated from the administration of the placebo, the same laboratory and clinical procedures were followed with the control group.

### *Administration of the Tests and Scales*

The following tests and scales were administered prior to the onset of medication and again after four months of treatment with either chlorpromazine or placebo:

(1) The Wechsler-Bellevue Intelligence Scale, Form I, was utilized to evaluate intellectual functioning. It was administered and scored in accordance with the instructions contained in the Manual.[24]

(2) The Rorschach Psychodiagnostic Test was administered to determine the presence of anxiety and hostility. The content of each protocol was analyzed by four judges according to a method devised by Elizur[5] for an evaluation of these tension systems and an Anxiety score and a "Hostility" score were secured for each patient.

(3) The Multidimentional Scale for Rating Psychiatric Patients (MSRPP)[17] was used to appraise overt behavior, the interview section of the Scale being completed by the psychiatrist in charge of the chronic female wards, while the ward behavior section was completed by the nurse or attendant on the ward.

Table I lists separately the mean scores of the groups on the three meadia of evaluation, pre- and post-treatment, together

with the statistical data. Application of the t-test for the significance of the difference in the means of related measures revealed that with respect to intellectual functioning the chlorpromazine group showed significant improvement in overall intellectual functioning (as measured by the Full Scale I.Q., the Verbal I.Q. and the Performance I.Q.) and in the Similarities subtest. Anxiety and hostility (as measured by the Anxiety and Hostility scores of the Rorschach) were significantly reduced as a result of treatment. Significant changes in patterns of overt behavior were indicated on the following items of the MSRPP: the total Morbidity score (a global measure of the severity of symptoms), Factor B (compliance vs. resistiveness), Factor C (paranoid projection), Factor D (activity level), Factor E (melancholy agitation), Factor F (perceptual distortion), Factor G (motor disturbances), Factor H (submissiveness vs. belligerence), and Factor K (conceptual disorganization). There were no significant changes in Factor A (retarded depression vs. manic excitement), Factor I (withdrawal), and Factor J (self-depreciation vs. grandiose expansiveness).

*Comparison of the Groups*

In order to firmly establish whether or not chlorpromazine was an effective therapuetic agent, it was necessary to compare the quantitative results obtained from the chlorpromazine group with the data from the placebo group. To attain this, it was first necessary to compare the two groups pre-treatment to determine if there were any significant differences between the means of the groups on any of the obtained scores. Using the formula for the significance of a difference between the means of unrelated groups, the t-test was applied. Table I lists the mean scores of the two groups, pre-treatment, on the three media of evaluation, together with the statistical data.

On the basis of the t-test, only Factor A of the MSRPP showed a significant difference between the two groups. All the other data did not reveal any significant differences. Therefore, with the exception of Factor A of the MSRPP, it was assumed that there were no differences initially between the two groups in respect to the measures involved, and that the two groups were drawn at random from the same population. Because Factor A was significantly different, analysis of covariance had to be utilized for this data.

Following the method described by Lindquist,[15] analysis of covariance was applied to the data of Factor A and an F value of .132 was obtained which was not significant. Therefore, although there was a significant difference between the means of the two groups with respect to Factor A prior to treatment, the obtained F indicated that there was no significant difference between the means of the two groups with respect to this factor upon the completion of treatment.

Since there were no significant differences between the means of the two groups on any of the other test items prior to treatment, the post-treatment data was analyzed by use of the t-test for the significance of a difference between the means of unrelated groups. The table lists the mean scores of the two groups, post-treatment, on the three media of evaluation, together with the statistical data.

On the basis of the t-test, the chlorpromazine group showed significant changes upon completion of treatment in the total Morbidity score, Factor F (perceptual distortion), Factor G (motor disturbances), Factor H (submissiveness vs. belligerence), and Factor K (conceptual disorganization) of the MSRPP, and in the Similarities subtest of the Wechsler-Bellevue. The placebo group showed significant change in Factor I (withdrawal) of the MSRPP. There were no significant differences on any of the other items.

## Discussion

*Intellectual Functioning*

It was initially hypothesized that chlorpromazine was an effective therapeutic agent which would have a signal effect upon the intellectual functioning of the patient. However, this was not confirmed by the data since both the chlorpromazine group and the placebo group showed significant improvement in overall intellectual functioning (as measured by the Wechsler-Bellevue I.Q.'s)

when each group was considered separately. This improvement was not significant, however, when the two groups were compared since the changes manifested were apparently of the same strength and in the same direction. In view of the fact that the placebo group kept pace with the chlorpromazine group, no special value can be attributed to the drug in regard to overall intellectual functioning. The improvements obtained, therefore, may be due to the limitations inherent in the test itself, since the gain in Full Scale I.Q. for both groups fell within the standard error of measurement of the test (5.674) as reported by Wechsler.[23] It may also be due, in part, to greater familiarity with the test upon retest, a factor which always plays a role in the comparison of two administrations of the same structured test.

The only part of the Wechsler-Bellevue which showed significant improvement, whether evaluated separately or in comparison with the placebo group, was the Similarities subtest for the chlorpromazine group. This finding was also reported by Gardner *et al.*,[9] although their related findings of improvement in Vocabulary and Picture Completion were not substantiated. They attributed this change to an enhanced willingness of the patient to talk because of the drug treatment. Another factor, however, might also play a role. According to Wechsler, the type of response received to the Similarities subtest throws light upon the character of the subject's thinking processes, the higher the Similarities score, the more logical the thinking. The significant improvement shown by the chlorpromazine group on this test would indicate that logical thinking was enhanced by the drug. This effect was also noted by Sainz,[20] who found enhanced logical thinking in paranoid and catatonic schizophrenics as a result of chlorpromazine treatment.

*Anxiety and Hostility*

With regard to the amount of anxiety and hostility present before and after treatment as measured by content analysis of the Rorschach, the chlorpromazine group, when evaluated separately, showed a significant reduction in anxiety and hostility post-treatment, while the placebo group showed no significant change in either. However, when the two groups were compared, there were no significant differences between them as a result of treatment. It appears, therefore, that while chlorpromazine may effectively reduce the amount of anxiety and hostility present, a placebo can produce the same result insofar as psychological evaluation of these tension systems is concerned.

Differences of opinion appear to prevail in regard to anxiety and hostility depending upon the type of assessment made by the investigator—clinical assessment of behavior through observation, measurement of overt behavior by means of a rating scale, or evaluation through psychological tests. Cohen,[2] for example, reported the drug to be most effective in cases of agitation, anxiety or aggression, while Delay and Deniker[3] stated that the phases of agitation and anxiety could be reduced together with impulsiveness and aggressiveness. When a rating scale is employed, however, the results reported are not as consistent. Thus, Trethowan and Scott[22] found significant response to chlorpromazine (as compared with a placebo) in respect to anxiety and tension and aggressive urges toward self and others. On the other hand, Rosner *et al.*,[19] using an anxiety rating scale measuring the level of anxiety present before and after treatment, found that while the placebo and chlorpromazine groups showed a significant change when evaluated separately, there were no significant differences between the groups. In this study, using psychological evaluation, a placebo was found to be as effective as the drug. Perhaps, as far as anxiety and hostility are concerned, the patients in this research were not the excited, overactive, overaggressive schizophrenics most frequently treated with chlorpromazine who appear to respond most favorably to the drug.

*Overt Behavior*

It is in the area of overt behavior that the majority of beneficial claims are made for chlorpromazine and this was substantiated by this research. Considering each group separately on the MSRPP, the chlorpromazine group, upon completion of treatment, showed significant improvement in the total Morbidity score and significant beha-

vioral changes in eight of the 11 factors, while the placebo group revealed no significant changes in any of the factors or in the total Morbidity score. The changes occurring in each of the factors were evaluated on the basis of the score of a presumed normal person as reported by Lorr.[17] Thus, the chlorpromazine group (a) showed a very significant reduction in overall symptomatology (Morbidity score); (b) showed decreased resistiveness and a greater tendency toward a more normal pattern of a balance between compliance and resistance (Factor B); (c) demonstrated less paranoid projection (Factor C); (d) changed from being slightly underactive before treatment to being much more inactive after treatment (Factor D); (e) showed a reduction in agitation to that of the nrom after treatment (Factor E); (f) showed a decrease in the amount of perceptual distortion (Factor F); (g) revealed a significant reduction in motor disturbances (Factor G); (h) changed from being slightly more belligerent before treatment to being more submissive after treatment (Factor H); and (i) showed a significant diminution in the severity of conceptual disorganization (Factor K).

Upon comparison of the two groups, however, the significance of four of the eight factors for the chlorpromazine group was not maintained. With the chlorpromazine group, Factors F, G, H, and K remained significantly different from the placebo group. The total Morbidity score remained significantly improved for the chlorpromazine group. Thus, the outstanding claims which could be made for the drug, insofar as this study is concerned, is that it decidedly reduces overall symptomatology, decreases perceptual distortion, reduces motor disturbances, makes for greater submissiveness, and improves conceptual organization. The placebo, on the other hand, tends to make a withdrawn patient even more withdrawn. Gardner *et al.*[9] also found the placebo group to be more withdrawn after treatment.

*Integration of Results*

The extravagant claims made by many investigators as to the therapeutic effectiveness of chlorpromazine were not substantiated by this research. Several reasons may have contributed to this conclusion: (1) Patients were not the excited, overactive, overaggressive schizophrenics frequently treated with the drug; (2) the dosage employed was not as high as that used by some investigators; (3) the use of a control (placebo) group tended to place the drug in a different perspective when comparisons were made; (4) the use of psychological tests and a rating scale made for more objective, valid evaluations than mere reliance on clinical assessment of overt behavior. On the basis of this study, it was apparent that the changes produced by chlorpromazine were primarily in the behavioral field and in the improvement of logical thinking, while the other changes manifested by the chlorpromazine group could also be produced by the administration of an inert medication.

That some improvement should occur, both psychologically and behaviorally, in the placebo group was not unexpected. Whether this was due to the psychological effect of taking a "pill" or to the added attention received by the placebo patient through clinical and laboratory procedures followed, cannot be evaluated. However, it has been recognized for a long time that, in many instances, a placebo has a powerful ameliorating effect. Although used more extensively than any other drug for many years, it is only lately that the placebo effect is undergoing serious investigation. In one study of the placebo effect made by Lasagna *et al.*,[14] it was found that the placebo reactor was, initially, more anxious, more emotionally labile, more concerned and preoccupied with internal body processes, and more dependent on outside stimulation than his own mental processes. The reaction to placebo, according to Rosenthal and Frank,[18] was that it could modify physiological functioning and increase the sense of well-being of the individual. In a survey of the few studies reported, Beecher[1] concluded: "It is evident that placebos have a high degree of therapeutic effectiveness in treating subjective responses, decided improvement . . . being produced in 35.2 ± 2.2% of the cases. This is shown in over 1000 patients in 15 studies covering a wide variety of areas . . ." On the basis of these formulations it would be expected that the administration of a placbeo would have some salutary effects. On the

other hand, Rosenthal and Frank also commented that the placebo effect "is not always favorable, but may also result in undesirable, distressful reactions." This may account for the more withdrawn attitude of the placebo group after treatment when the initial effect of "being treated" has worn off and no positive changes have become apparent to the patient.

The fact that the chlorpromazine group improved significantly in many instances, when the group was evaluated by itself, was negated when comparisons were made with the placebo group. It may be concluded, therefore, that on the basis of this study, placebo was just as effective in producing certain psychological, behavioral and intellectual changes as was chlorpromazine, and that it was the administration of a "pill" and not necessarily a drug which brought about these modifications. Nevertheless, the value of including a placebo group in a research such as this was amply demonstrated. Without the control group, many additional claims could be made for the therapeutic effectiveness of chlorpromazine which would not really be statistically significant.

On the whole, it appears that the effect of chlorpromazine is primarily confined to the behavioral field with little change in the psychological substructure. Thus, Elkes and Elkes[6] found no change in the ingrained psychotic thought disorder; Kielholz and Labhardt[12] believed the drug only suppressed the symptoms; Hall and Dunlap[10] reported there was no definite evidence that the drug altered the "basic psychotic process." Freeman[8] summed up these general conclusions by stating, "There is no definite evidence that the drugs affect the ideational content of psychoses or even of the psychoneuroses. They diminish the emotional expression of the abnormal thought content, but it is questionable whether the underlying psychic turmoil is affected."

However, the results obtained from this research do point up a certain theoretical approach to the tranquilizing drug chlorpromazine. In the V A Bulletin on the MSRPP, Lorr[17] describes a grouping of various factors which he calls the schizophrenic sequence. Patterned after a thesis presented by Jenkins,[11] it defines three stages in the development and intensification of a schizophrenic psychosis. The first stage is that of schizoid withdrawal, characterized by withdrawal of attention and interest from the outer environment and replacement by autistic fantasy. The second stage is the actual schizophrenic process wherein the breakdown of adaptive processes leads to regressive behavior. In this stage, the acute anxiety which is experienced leads to preoccupation, indecision, perplexity and puzzling, and, ultimately, to a weakening of the efficiency of the conceptual process and perception of external reality, a pattern of disintegration of thinking. The third stage is that of psychotic reorganization, ". . . a process which may be regarded as an effort to maintain the integration of a disintegrating personality."[11]

According to Lorr, there are factors on the MSRPP which are indicative of each stage of this sequence. Thus, Factor I (withdrawal) is applicable to the first stage; Factor K (conceptual disorganization), Factor F (perceptual distortion), and Factor G (motor disturbances) are related to the second stage; while Factor C (paranoid projection) and Factor J (grandiose expansiveness) are part of the third stage.

In this research the chlorpromazine group showed the following patterns as distinct from the placebo group:

(1) Paranoid projection (Factor C) was greatly reduced, indicating a trend away from the third stage of psychotic reorganization. (The group was not, at any time, overly grandiose to have to consider Factor J as an important element.)

(2) Conceptual disorganization (Factor K) was significantly reduced, perceptual distortion (Factor F) was significantly lessened, motor disturbances (Factor G) were significantly retarded, logical thinking (Similarities subtest) was significantly enhanced, and anxiety (Anxiety score) was greatly reduced. All these are elements of the second stage of the schizophrenic sequence, that of psychotic disorganization.

(3) Withdrawal (Factor I) remained constant, though the group, at the end of treatment, was still decidedly withdrawn. Thus, there was no change in the first stage of the schizophrenic sequence.

From this study of chronic schizophrenic females, it is apparent that chlorpromazine has the effect of starting a reversal of the schizophrenic process by penetrating the second and third stages of the sequence—psychotic disorganization and reorganization, but the drug does not affect the first stage—withdrawal. This may be indicative why the psychological picture, as revealed by psychological tests, does not appear to change. The patient still presents the same psychotic substructure but with a defensive reorganization taking place, while the change in intensity, regressive aspects, and depths of the psychosis is most clearly revealed in the overt behavioral patterns.

At the same time, some negative aspects of chlorpromazine treatment appear in the picture which must be seriously considered so that full advantage can be taken of the progress being made by the patient. According to Jenkins,[11] "Reversing the process of schizophrenic disorganization seems to depend upon the achievement by the patient of satisfactions through adjustive behavior which outbalance the frustrations which lead to the progress of the illness." The fact that the chlorpromazine group showed greater inactivity (Factor D) and more submissiveness (Factor H) might be acceptable from the standpoint of ward management and care, but it portends an achievement of satisfactions by a passive acceptance of the medication without any active participation on the part of the patient to assist in his recovery. In order to overcome this lethargic attitude and assist the patient to maintain socially acceptable behavior in which satisfactions can still be obtained and frustrations tolerated, it seems necessary to supplement chlorpromazine treatment with other therapeutic measures. By such means as psychotherapy, occupational and recreational therapy, and other rehabilitative procedures, the patient can be helped in the reorganization of his defenses and gain ego strength. Thus, while chlorpromazine can initiate a reversal of the schizophrenic sequence, it must be followed by more intensive therapeutic measures. This is in line with the later recommendations of Delay and Deniker,[4] pioneer investigators of chlorpromazine, and the general tenor of the symposium held under the auspices of Smith, Kline & French Laboratories.[22]

Although the conclusions and theoretical considerations can only be tentative due to the small, restricted sample of the research, they point up the fact that too much reliance cannot be placed on chlorpromazine alone as a therapeutic agent without the use of other therapeutic measures available to a hospital regimen.

## Summary

The purpose of this investigation was to determine the effectiveness of chlorpromazine as a therapeutic agent in the treatment of chronic, female, hospitalized schizophrenics. Two groups of patients were utilized: an experimental group of 18 which received between 400 and 600 mg. of chlorpromazine daily, and a control group of 16 which received 400 mg. of placebo daily. The study was concerned with changes that occurred in intellectual functioning, the presence of anxiety and hostility, and overt behavioral patterns as a result of treatment. For this purpose, the Wechsler-Bellevue Intelligence Scale, the Rorschach, and the Multidimensional Scale for Rating Psychiatric Patients were administered prior to the onset of treatment and then repeated four months later at the conclusion of treatment. Data obtained from the psychological tests and rating scale were subjected to small sample statistical techniques. The chlorpromazine group and the placebo group were each studied separately and comparisons were made between the two groups.

## Conclusions

The following conclusions are tentative in nature due to the small number of samples involved and the limitations of the experimental design. The conclusions are delimited to white, female, chronic schizophrenics between the ages of 20 and 55 who have been hospitalized for a consecutive minimum period of two years:

(1) Chlorpromazine is an effective therapeutic agent insofar as it enhances logical thinking, reduces the severity of symptomatology, and brings about improved patterns of overt behavior.

(2) Chlorpromazine treatment has the ef-

fect of initiating a reversal of the schizophrenic process by penetrating the psychotic disorganization and reorganization but it has little influence on the withdrawn attitude of the patient.

(3) Chlorpromazine can produce greater inactivity and submissiveness so that the patient passively accepts the medication as treatment without active participation on his part, indicating a need for supplementary rehabilitative procedures.

(4) Chlorpromazine was not significantly more effective than a placebo in improving overall intellectual functioning, or in reducing the amount of anxiety and hostility present in the patient.

(5) The use of a control (placebo) group for comparison purposes, and the use of psychological tests and scales instead of reliance on clinical assessments of overt behavior tend to make for more objective, valid evaluations of chlorpromazine treatment.

*BIBLIOGRAPHY*


1. Beecher, H. K.: The powerful placebo. *J.A.M.A.*, 159 (1955), pp 1602-1606.
2. Cohen, I. M.: Effects of chlorpromazine in psychiatric disorders. *Am. J. of Med. Sciences,* 229 (1955), pp. 355-362.
3. Delay, J., and Deniker, P.: Symposium on chlorpromazine in clinical medicine: Neuroleptic effects of chlorpromazine in therapeutics of neuropsychiatry. *Int. Record of Med. and Gen. Practice Cl.,* 168 (1955), pp. 318-326.
4. Delay, J., and Deniker, P.: International symposium on chlorpromazine. Part I: Chlorpromazine and neuroleptic treatments in psychiatry. *J. of Clin. and Exper. Psychopathology and Quart. rev. of Psychiat. and Neurol.,* 17 (1956), pp. 19-24.
5. Elizur, A.: Content analysis of the Rorschach with regard to anxiety and hostility. *Rorschach Research Exchange and Journal of Projective Techniques,* 13 (1949), pp. 247-284.
6. Elkes, J., and Elkes, C.: Effect of chlorpromazine on the behaviour of chronically overactive psychotic patients. *Br. Med. J.,* II:4887 (1954), pp. 560-565.
7. Feldman, P. E., Lacy, B. S., Walker, A. E., and Garrez, N. J.: A controlled, blind study of effects of Thorazine on psychotic behavior. *Bull. of the Menninger Cl.,* 20 (1956), pp. 25-47.
8. Freeman, H.: A critique of the tranquilizing drugs, chlorpromazine and reserpine, in neuropsychiatry. *New Eng. J. of Med.,* 255 (1956), pp. 877-883.
9. Gardner, M. J., Hawkins, H. M., Judah, L. N., and Murphree, O. D.: Objective measurement of psychiatric changes produced by chlorpromazine and reserpine in chronic schizophrenia. *Psychiat. Research Reports I,* July 1955, pp. 77-83.
10. Hall, R. A., and Dunlap, D. J.: A study of chlorpromazine: Methodology and results with chronic semi-disturbed schizophrenics. *J. of Nerv. and Ment. Dis.,* 122 (1955), pp. 301-314.
11. Jenkins, R. L.: The schizophrenic sequence: Withdrawal, disorganization, psychotic reorganization. *Am. J. of Orthopsychiatry,* 22 (1952), pp. 738-748.
12. Kielholz, P., and Labhardt, F.: International symposium on chlorpromazine. Part I: Treatment of mental disorders with chlorpromazine. *J. of Clin. and Exper. Psychopathology and Quart. Rev. of Psychiat. and Neurol.,* 17 (1956), pp. 38-44.
13. Kinross-Wright, V.: The intensive chlorpromazine treatment of schizophrenia. *Psychiatric Research Reports I,* July 1955, pp. 53-62.
14. Lasagna, L., Mosteller, F., Felsinger, J. M., and Beecher, H. K.: A study of the placebo response. *Am. J. of Med.,* 16 (1954), pp. 770-779.
15. Lindquist, E. F.: Statistical Analysis in Educational Research. Boston: *Houghton Mifflin Company,* 1940, pp. xiii+266.
16. Litteral, E. B., and Wilkinson, W. E.: The advantages, disadvantages, and limitations of the use of chlorpromazine as a substitute for certain somatic treatment methods in psychiatry. *Psychiatric Research Reports I,* July 1955, pp. 63-71.
17. Lorr, M.: Multidimensional Scale for Rating Psychiatric Patients, Hospital Form. *Vet. Admin. Tech. Bull. 10-507,* November 16, 1953, pp. 44.
18. Rosenthal, D., and Frank, J. D.: Psychotherapy and the placebo effect. *Psychological Bulletin,* 53 (1956), pp. 394-302.
19. Rosner, H., Levine, S., Hess, H., and Kaye, H.: A comparative study of the effect on anxiety of chlorpromazine reserpine, phenobarbital, and a placebo. *J. of Nerv. and Ment. Dis.,* 122 (1955), pp. 505-517.
20. Sainz, A.: Chlorpromazine in psychiatric disorders. *Prescriber,* 2 (1955), pp. 14-21.
21. Smith, Kline & French Laboratories: Chlorpromazine and Mental Health. Philadelphia: *Lea & Febiger,* 1955, pp. 200.
22. Trethowan, W. H., and Scott, P. A. L.: Chlorpromazine in obsessive-compulsive and allied disorders. *Lancet,* 1:6868 (1955), pp. 781-785.
23. Wechsler, D.: Measurement of Adult Intelligence (Third Edition). Baltimore: *The Williams & Wilkins Company,* 1944, pp. vii+258.

# A Comparative Study of Modified and Unmodified Electric Shock Treatment

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Studies comparing the modified and unmodified methods of electric shock treatment have not established the relative value of each method because the groups of patients compared have been different in several respects. Patients receiving the modified treatments have generally been older, with more physical disabilities or have not been treated at the same time as the patients receiving the unmodified treatments.[1-4] As a result, our knowledge of the effects of electric shock treatment still largely depends on experience with unmodified seizures. The study reported here undertakes to compare the results and complications of the modified and unmodified methods of treatment and patients' attitudes toward each in patients selected at random for each type of treatment.

## Subjects and Methods

The study was designed to obtain comparable groups by a random placement of consecutive referrals for electric shock treatment. The subjects, 134 in-patients of the Massachusetts Mental Health Center (Boston Psychopathic Hospital), were divided into three groups. In 74 cases there was no heart disease, skeletal abnormality or other physical disabilities which would require use of the modified treatment and these patients were placed by chance in a group to receive unmodified treatment or in one to receive modified treatment. There were 40 patients in the unmodified group and 34 in the modified group. The other 60 patients of the 134 were over sixty or had physical disabilities requiring use of the modified procedure. This third group of patients is referred to as the required modified group. Data are available on 125 patients of the 134, since nine patients could not be followed.

The diagnosis of each patient was based on the resident's clinical impression and an interview with the writer. Schizophrenia was diagnosed where there were dissociative phenomena, autistic signs or flattened or inappropriate affect. Patients with both schizophrenic symptoms and mood disturbances suggesting affective states were classified as schizo-affective psychoses or involutional paranoid depressions. Among the 125 patients there were 94 affective disorders, including involutional depressions, involutional agitated depressions, psychotic and neurotic depressive reactions, manic-depressive psychoses of both manic and depressive types, and involutional paranoid states. The ten schizo-affective patients were grouped with the 21 schizophrenics. Patients with brain syndromes or neuroses other than neurotic depressions were not included in the study.

Thirteen patients were changed from unmodified to modified treatment because of complications occurring in the course of treatment (principally spinal fractures and severe back or substernal pain). Two were changed from modified to unmodified treatment because of prolonged apnea or fear of injections. Table 1 presents the number of patients in each diagnostic and treatment group and the number completing the modified and unmodified courses of treatment.

TABLE 1

| | Affective Disorders | Schizophrenics | Lost to Follow-up |
|---|---|---|---|
| Modified Group | 21 | 10 | 3 |
| Number Completing Modified | 21 | 8 | |
| Unmodified Group | 26 | 13 | 1 |
| Number Completing Unmodified | 17 | 9 | 1 |
| Required Modified Group | 47 | 8 | 5 |
| Totals | 94 | 31 | 9 |

Electric shock treatments were administered with the Reiter Electrostimulator Model RC 47C. All patients received 1/75 gr. atropine subcutaneously one-half hour before treatment, and patients in the modified groups were given pentothal sodium (200-300 mg) and succinylcholine chloride

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(20-50 mg) intravenously just before treatment. Patients on modified treatment also received positive pressure oxygen during the periods of apnea before and after treatment.

The writer kept note of any complications observed in the course of treatment, particularly spinal and electrocardiographic changes in the modified and unmodified groups. Thoracic and lumbar spine x-rays were taken before and after treatment on 60 of the 74 patients in these groups and electrocardiograms before treatment and within one week after treatment are available on 52.

Residents administering treatment noted which patients resisted coming into the treatment room and which were tense or relatively relaxed. Note was also kept of patients' behavior in the recovery room just after treatment: whether they rested quietly or appeared frightened and restless. The writer asked each patient, before and after the course of treatments, if he or she feared the treatments.

The subjects were interviewed by the writer within two weeks after completion of treatment and the resident's description of any changes in the patient's psychological state was noted. Six months after treatment each patient's condition was re-investigated. These data were collected by two or more of the following methods: interviewing the patient (in person or by telephone), speaking to relatives or the patient's doctor, or by examining hospital records. An attempt was made to verify data by seeking reports from different sources. The information sought included amounts of intervening hospitalization or other treatment, work and housework status at six months, and the extent to which the residents' plans at the time of discharge for the patients' continued treatment were carried out during the follow-up period.

The patients were divided into three Outcome Groups:

I: Hospitalized throughout the six months after completion of electric shock treatment or re-hospitalized during the follow-up period;

II: At home and not re-hospitalized by the end of six months, but not working outside the home or even inside it;

III: Not re-hospitalized in the six-month period and working part-time or full-time outside the home or doing housework inside it.

## Results

Table 2 demonstrates that there were no significant differences in the results of modified and unmodified shock treatment as measured by the average numbers of treatments given, length of hospitalization in the six months after treatment, immediate response to treatment and status at six months. Statistical comparisons, between the groups, of average numbers of treatments given and average lengths of hospitalizations after treatment were made by the Mann-Whitney U-Test.[5] The chi-square test was used in comparing the other data. There were also no statistically significant differences between the results with patients assigned at random to the modified or unmodified groups and the results with those requiring the modified treatment because of physical disabilities or age.

The average number of days hospitalized after treatment included both the time between the end of treatment and discharge and any period of re-hospitalization during the six month follow-up period. The degree of immediate improvement was determined within two weeks after the end of treatment. Table 2 gives the percentage of patients not improved or little improved and those moderately or much improved. Each patient's rating was a composite of the resident's, patient's and writer's impressions.

Table 2 also shows the percentage of patients in each of the three Outcome Groups. As would be expected, schizophrenic illnesses were less responsive to shock treatment than were affective illnesses and were given longer courses of treatment.

### Comparison of Patients' Attitudes Toward Modified and Unmodified Treatments

Table 3 presents the data comparing patients' attitudes toward the two methods of treatment. There were no statistically significant differences between the modified and unmodified groups in the numbers of patients who appeared markedly tense just before treatments and in the numbers who expressed fear of the treatment before or after their courses.

The patients requiring modification because of physical disabilities or age more often appeared markedly tense just before

## TABLE 2

*Results of Treatment with Modified and Unmodified Shock Treatment*

| | Average Number of Treatments | Average No. of Days Hospit. in 6 Mos. After Rx. | Immediate Improvement: % Not Improved or Little Improved | Immediate Improvement: % Moderately or Much Improved | Outcome Group (at 6 mos.) I | II | III |
|---|---|---|---|---|---|---|---|
| AFFECTIVE ILLNESSES | | | | | | | |
| Modified Treatment | 11.0 | 37 days | 19% | 81% | 29% | 5% | 66% |
| Unmodified Treatment | 12.3 | 35 | 36 | 64 | 26 | 19 | 55 |
| Unmodified Treatment (those completing unmodified course) | 11.7 | 44 | 24 | 76 | 29 | 18 | 53 |
| Required Modified Treatment | 10.2 | 36 | 27 | 73 | 23 | 15 | 62 |
| SCHIZOPHRENIC ILLNESSES | | | | | | | |
| Modified Treatment | 14.5 | 114 | 62 | 38 | 38 | 12 | 50 |
| Unmodified Treatment | 11.7 | 81 | 62 | 38 | 39 | 15 | 46 |
| Unmodified Treatment (those completing unmodified course) | 11.0 | 90 | 67 | 33 | 56 | 11 | 33 |
| Required Modified Treatment | 13.9 | 105 | 50 | 50 | 50 | 0 | 50 |

## TABLE 3

*Comparison of Patients' Attitudes Toward Modified and Unmodified Shock Treatment*

| | % with signs of marked tension just before Rx. | % expressing fear of Rx. before Rx. | % expressing fear of Rx. after Rx. | % showing recovery-room restlessness | % with plans fulfilled | % with contact with staff after discharge |
|---|---|---|---|---|---|---|
| AFFECTIVE ILLNESSES | | | | | | |
| Modified Treatment | 40% | 67% | 50% | 5% | 67% | 62% |
| Unmodified Treatment | 42% | 58% | 54% | 58% | 75% | 83% |
| Unmodified Treatment (those completing unmodified course) | 40% | 60% | 56% | 59% | 60% | 73% |
| Required Modified Treatment | 64% | 70% | * | 9% | 67% | 48% |
| SCHIZOPHRENIC ILLNESSES | | | | | | |
| Modified Treatment | 67% | * | * | 30% | 100% | 88% |
| Unmodified Treatment | 77% | * | * | 46% | 73% | 73% |
| Unmodified Treatment (those completing unmodified course) | 78% | | | 55% | 57% | 71% |
| Required Modified Treatment | 87% | * | * | 2% | 67% | 67% |

*Data not obtained from sufficient numbers of patients.

treatment than the patients in the other groups. Restlessness just after treatment was largely confined to patients receiving the unmodified procedure.

Another possible measure of patients' attitudes toward the treatment experience is the extent to which they continued contact with the hospital after discharge and in this we found no significant differences in the groups. There were also no differences among patients with affective illnesses in the numbers who fulfilled the treatment plans made at the time of discharge. Among schizophrenic subjects, however, more carried out the plans made before discharge of those who had received the modified experience than of those who completed courses of unmodified treatment.

We had expected patients to give evidence of being more fearful of the unmodified than of the modified treatment. From experience with the group therapy of patients receiving shock treatment we had learned that patients usually express a preference for the modified experience, although, as evidenced here, most express fear of both procedures.

The two patients who ran away from the hospital during the course of treatment were both undergoing the unmodified procedure.

During the six-month follow-up period, six patients with affective illnesses who had received unmodified shock treatment were given further shock treatment in the outpatient clinic. Only two patients who had received the modified treatments were given outpatient shock treatment. This suggests that the unmodified experience did not leave patients receiving it so hostile or afraid of the treatment that they would be unwilling to return for more. It also raises the question whether the treatment results of the unmodified method are as lasting as those of the modified method.

Restlessness just after treatment was infrequent with the modified procedure. It was shown by over half the patients receiving unmodified treatment. It is likely that the Pentothal given as part of the modified procedure accounts for this difference. When restlessness did occur it was more common early in the course of treatment. The progressive development of fear which is thought to be associated with disorientation on waking up, as described by Gallinek[6] and others, was noted in six patients, five of whom received the unmodified treatment. There was no consistent relationship between this occurrence and favorable or unfavorable outcome.

Although schizophrenic patients were in general more resistive and tense just before treatment than were patients with affective disorders, no more of them broke contact with the hospital or failed to carry through the plans made at the time of discharge.

Patients given the modified treatment because of physical disabilities or advanced age were more often thought to be tense or resistive before treatment than the patients in the other groups. This may reflect the apprehension felt by members of the staff in the shock treatment of physically ill and aged patients.

### Complications

Table 4 presents the complications observed in the three groups of patients. It is apparent that complications are more frequent with the unmodified treatment than with the modified treatment and that they chiefly consist of spinal fractures and organic-psychotic reactions.

TABLE 4

*Number of Patients Experiencing Complications During the Course of Treatment*

| | Fractures | Organic-Psychotic Reactions | Miscellaneous |
|---|---|---|---|
| Modified Treatment | 0 | 0 | 4 |
| Unmodified Treatment | 10 | 3 | 2 |
| Required Modified Treatment | X-Rays not routinely taken | 0 | 4 |

X-rays of the thoracic and lumbar spine were taken on 36 of the 40 patients given unmodified shock treatment and ten (28%) of the 36 showed x-ray evidence of spinal fractures after treatment that was not present before treatment. There were 19 vertebral body fractures and all were in the region $T_4$ through $T_8$. One patient also suffered a fracture of the right scapula (on the superior rim, close to the medial angulus). No evidence of spinal fractures was noted in the 24 patients who were x-rayed before and after the course of modified treatments.

Three patients on the unmodified treatment developed organic-psychotic reactions, consisting of disorientation, psychomotor excitement, delusions and hallucinations. These symptoms cleared rapidly when the treatments were stopped. Organic-psychotic reactions were not seen in any of the patients receiving the modified treatments, including the group of patients whose treatments were modified because of physical disabilities or advanced age.

The only patient in the series who experienced spontaneous seizures during the follow-up period had received unmodified shock treatment. This woman had a history of grand mal epilepsy and experienced two seizures in the six months after treatment. She had had only one seizure in the three years preceding treatment.

Thirteen of the 40 patients started on unmodified shock treatment were changed to the modified procedure as a result of fractures, severe back or substernal pain, or, in one case, because of a torn patellar tendon. Two patients of the modified groups were

changed to unmodified, in one case because of prolonged periods of apnea (over fifteen minutes) following the modified treatment, and in the other case because of resistance to injections.

Among the 31 patients in the modified group there were four complications. One was the case of prolonged apnea. A second patient had an aspiration pneumonia after treatment (involving the right lower lobe) and a third lost three front teeth in the course of an airway's being inserted. The fourth patient was hypotensive just after treatment but suffered no apparent cardiac or cerebral damage.

Among the 60 patients in the required modified group there were also four complications: two cases of venous thrombosis and associated neuritis as a result of the infiltration of Pentothal at the site of injection, one case of laryngospasm because of sensitivity to Pentothal, and one case of coronary insufficiency (as evidenced by pain and electrocardiographic changes) without evidence of infarction.

Electrocardiograms were taken on 30 of the patients who received unmodified treatment before and within one week after treatment. There were no significant changes that could be confidently attributed to the shock treatment. In one case signs of incomplete right bundle branch block became more prominent in the electrocardiogram after treatment than they had been before treatment, but this was probably a result of differences in the placement of the cardiac electrodes. In another case ST depressions were more prominent at the same heart rate after shock treatment than before it, which can be explained by the spontaneous fluctuations common in the electrocardiograms of patients with coronary artery disease.

Of the patients in the modified group 22 were given electrocardiograms before and after treatment and no significant changes were noted. In the group requiring modified treatment electrocardiograms were not routinely taken after treatment.

## Discussion

A comparison of the results of modified and unmodified shock treatment demonstrated that there were no significant differences in the results of the two treatment methods as measured by the average numbers of treatments given, the length of hospitalization in the six months after treatment, the immediate response to treatment, and the outcome at six months. This was true for both the affective and schizophrenic disorders. The results of treatment in a group of patients requiring the modified procedure because of physical disabilities or advanced age were not significantly different from the results in the two groups of patients not requiring modification.

These conclusions agree with those of earlier reports based on the comparison of unmodified treatment results with the results of treating patients given modified because of physical disabilities, and the comparison of the results in patients given the two treatments at different times.[1-4]

We were surprised to learn that there were few differences in patients' apparent attitudes toward the two types of shock treatment. The two patient groups did not differ in the amount of tension evident just before treatment, the frequency with which fear of treatment was expressed before and after it, the extent to which discharge plans were fulfilled, and the extent to which, among the affective illnesses, contact with the hospital was continued after discharge. It may be that the greater fear we expected patients to have of the unmodified procedure is partly a result of our own attitudes toward the different methods of treatment.

Restlessness was much more frequent after treatment in the unmodified than in the modified group. This lesser frequency of restlessness with the modified procedure is an important advantage of the method because uncontrolled restlessness may lead to self-injury and necessitates additional personnel in the recovery room.

Complications were more frequent among those given unmodified treatment than among those given modified. The incidence of fractures in this series of unmodified treatments, 28%, is in keeping with those of other series in which spinal x-rays were routinely taken.[7,8]

Organic-psychotic reactions developed in three patients receiving unmodified treat-

ment and in none of the patients of the modified group. This suggests that the unmodified treatment may be more disturbing to brain function than is the modified treatment. Support for this conclusion is provided by the work of Impastato and associates[9] who reported less disturbance of the electroencephalogram after electric shock treatment given with a barbiturate.

Certain complications occurred with the modified treatment that did not occur with the unmodified. These included venous thrombosis, aspiration pneumonia, broken teeth, prolonged apnea and transient hypotension. We have not observed venous thrombosis since we have slowed the rate of Pentothal injections, and prolonged apnea (over five minutes) has not occurred since we have kept succinylcholine dosage below 25 mg.

We have concluded from this study that the modified treatment is preferable to the unmodified. The results of the two methods are not different, restlessness after treatment is common with the unmodified method and unusual with the modified, and complications are much more frequent with the unmodified than with modified treatment.

The outstanding problem in the use of modified shock treatment is the management of the anaesthetic and muscle-paralyzing agents and the resulting apnea. Where the services of a trained anaesthetist are available these hazards are minimal. In many institutions, however, such services are not available and the benefits of the modified treatment make worthwhile a further search for means to reduce the anaesthetic hazards. Efforts have been made to dispense with preliminary barbiturate anaesthesia[10] or to substitute an electrical anaesthesia.[11] With either of these methods, however, some period of succinylcholine-induced apnea may follow treatment and without preliminary anaesthesia patients experience anxiety after being given the succinylcholine. We have been experimenting with the use of very small amounts of succinylcholine and Pentothal in an effort to see how brief the apnea can be made without encountering complications of unmodified treatment. The results of this work will be reported later.

**Summary**

The results and complications of modified and unmodified shock treatment, and patients' attitudes toward each, were compared in groups of subjects randomly selected for each treatment. The results of the two treatment methods were not significantly different. There were also few differences in patients' attitudes toward the two procedures. Complications, however, were more frequent among patients given the unmodified treatment than among those given the modified treatment. Restlessness just after treatment was also more common with the unmodified method. We have concluded that modified shock treatment is the method of choice.

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*Author's Note:* The author wishes to express his appreciation to Lillian Furtado, R.N., and John Leonard for having made many of the observations on which the study of patients' attitudes is based and to Alberto DiMascio, M.A., for help with the statistical analysis.

*REFERENCES*

1. Lincoln, J. R., and Broggi, F. S.: Safe Management of Modified Electrotherapy. *New Eng. J. Med.*, 253: 546-549 (September 29), 1955.
2. Rietman, H. J., and Delgado, E.: Technique for the Modification of Electroshock with Succinylcholine. *Dis. Nerv. Syst.*, 16: 3-8, 1955.
3. Schiele, B. C., and Margolis, P. M: Value of Succinylcholine Chloride in Electroconvulsive Therapy. *Minnesota Med.*, 38: 1-4, 1955.
4. Ardis, J. A., and Wyllis, A. M.: The Routine Use of Muscular Relaxants Prior to Electroconvulsive Therapy. *J. Ment. Sc.*, 99: 148-153, 1953.
5. Moses, L. E.: Non-Parametric Statistics for Psychological Research. *Psychol. Bull.*, 49: 122-143, 1952.
6. Gallinek, A.: Fear and Anxiety in the Course of Electroshock Therapy. *Am. J. Psychiat.*, 113: 428-434, 1956.
7. Meschan, I., Scruggs, J. B., Jr., and Calhoun, J. D.: Convulsive Fractures of the Dorsal Spine Following Electric-Shock Therapy. *Radiology*, 54: 180-193, 1950.
8. Newbury, C. L., and Etter, L. E.: Clarification of the Problem of Vertebral Fractures from Convulsive Therapy. *Arch. Neurol. & Psychiat.*, 74: 479-487, 1955.
9. Impastato, D. J., Back, R., Frosch, J., and Wortis, S. B.: Modification of the Electrofit. I Sodium Amytal. *Am. J. Psychiat.*, 100: 358-360, 1943.
10. Murray, N.: A Clinical Commentary on the Use of Succinylcholine Chloride in Electroshock Therapy. *Texas Rep. Biol. & Med.*, 11: 593-596, 1953.
11. Impastato, D. J., and Gabriel, A. R.: A New Succinylcholine Technic. *Dis. Nerv. System*, 18: 34-35, 1957.

# Friedreich's Ataxia Ascribed to Trauma

## (Case Report)

JACOB H. FRIEDMAN, M.D., and ALBERTO ARENGO, M.D.

Friedreich's ataxia is defined as a chronic, slowly progressive, familial, heredodegenerative disease, usually commencing in childhood, affecting chiefly the posterior columns, the spinocerebellar and pyramidal tracts. Features of diffuse ectodermal involvement, apart from the nervous system, are also noted. Friedreich's foot is constantly seen, the typical deformity being a pes cavus with talipes varus or equinovarus. The etiology is unknown. Remissions occur infrequently and actual cessation must be considered rare.[1]

Our case is unusual in that we have been unable to find recorded in the literature a case showing signs of Friedreich's ataxia ascribed to cerebral trauma with recovery or remission.

### *Case Report*

F. C., a 9 year old boy, was admitted to Fordham Hospital November 4, 1956, at 4:00 P.M., with a history of having fallen twelve feet into the cellar of the building where he resides, at 12:30 P.M. He was said to have been unconscious for a few minutes and then he vomited. On admission an extensive contusion, extending from the forehead to the occipital region on the right, abrasions on the forehead and lower extremities, were noted. The pulse rate was 96 per minute, regular, of good volume, tension and equal. B.P. was 120/70. There was no bleeding from the nose or ears. Neurological examination was considered normal, except for a semistuporous state and diminished pupillary responses and the fundi were considered congested. A diagnosis of cerebral concussion was made. Two hours after admission he was fully conscious. Temperature rose to 101.8° F. X-rays of chest, skull, spine and long bones revealed no fractures. At times he was incoherent. The following day, on November 5th, temperature was normal. On November 6th, two days after admission, he had amnesia for events preceding and following the accident. He was slow in responding to commands or answering questions but was coherent. The pupils still reacted sluggishly to light. The fundi were now considered normal. A right supranuclear facial paresis was noted. All deep reflexes were depressed. There were no pathological reflexes. No ataxia could be demonstratd. Motor power appeared good. There was no evidence of sensory involvement. The arches were elevated and the orthopedist made a diagnosis of bilateral talipes cavus. There was partial webbing between the second and third toes of each foot. On November 14th he was considered fully recovered and was discharged with the recommendation that he be seen in the neurological and orthopedic clinics.

On November 20th the patient was brought back to the neurological clinic by the mother with report that after returning from the hospital she noted that the patient had difficulty in walking. He was unsteady in placing his feet on the floor and he fell several times. He was admitted to the neuropsychiatric service that day. Physical examination was found to be normal. Pulse rate was 86 per minute, regular, of good volume, tension and equal; B.P. 110/60; temperature 98.6°F. He was cooperative. The pupils were equal and reacted well to light and accommodation. Fundi were normal with no visual field defect. A right supranuclear facial weakness was noted. The deep reflexes were depressed but equal. Superficial reflexes were present and equal. Pathological reflexes were not elicited. Motor power was intact. There was marked ataxia on finger to nose test and heel to knee test, bilaterally, with eyes open. The gait was markedly ataxic and he was unable to walk unassisted. Bilateral dysdiadochokinesia was noted. Hypotonia of the extremities were present. There was intention tremor to the fingers. Position sense involvement was noted in the toes of the left foot. Superficial sensation was intact. There were no meningeal signs. He was restless and irritable. A lumbar puncture on November 23, was traumatic as the patient was uncooperative. However, on December 23rd, a lumbar puncture was successfully done and revealed normal values, cerebro-spinal pressure being 100 mm. water, no cells, proteins 35 mg. %, of glucose 55 mg. %, chlorides 698 mg. %, Pandy negative, Wasserman negative, colloidal gold curve 000000000. He was given multi-therapeutic vitamin capsule, one, twice daily, by mouth, and 100 mg. vitamin $B_1$ intramuscular injections, 3 times weekly. On November 27, 1956, he commenced to show gradual improvement. However, on December 10th he had an episode of headaches and vomiting, lasting several hours. On December 24, 1956 he was discharged to the neurological clinic for further observation. He was able to walk by himself. Except for slight ataxia on heel to knee test and minimal signs of right supranuclear facial paresis, neurological examination was normal. He has been periodically examined in the neurological clinic. He returned to school after the Christmas holidays. Neurological status on May 7, 1957 revealed only a minimal right supranuclear facial weakness. He was partaking of all school activities, including the routine gymnastics and he played freely with other

*From the Neuropsychiatric Service, Fordham Hospital, New York, N. Y.

children. He is considered recovered, or possibly in a remission.

The patient's birth was spontaneous. He walked and talked at eighteen months of age and was toilet trained at three years of age. He had measles, scarlet fever, chicken pox, diphtheria, mumps, all uncomplicated, and a tonsillectomy at 7 years of age. He is the oldest of three siblings. A brother, age 4 years, began to walk at 4 years of age. Prior to the accident, the patient was considered a normal youngster.

### *Discussion*

The signs of altered cerebellar function with disturbance of position sense of the left toes, a right supranuclear facial weakness, irritability, restlessness, with the characteristic finding of the markedly exaggerated plantar arch, diagnosed as a bilateral talipes cavus, and webbing of the toes, led us to make a diagnosis of Friedreich's ataxia.

The Friedreich's ataxia occurred two weeks after the patient suffered a severe cerebral concussion. We can only conjecture whether the Friedreich's ataxia was directly related to the cerebral trauma, or whether the illness occurred independently and was incidental to the cerebral trauma.

Closely allied to Friedreich's ataxia and in the same group of heredodegenerative diseases, is cerebellar ataxia. St. Thieffrey and Arthius[2] cite cases of acute cerebellar ataxia, occurring in childhood, who show gradual improvement with complete recovery. Shanks[3] discusses the syndrome of cerebellar ataxia, stating that when the onset was sudden the course was always benign, whereas, the disease was progressive when the ataxia began insidiously. Waldman[4] describes three cases of acute cerebellar ataxia occurring in apparently normal children or during acute infectious disease with recovery. Pratt-Thomas and Berger[5] report three cases of cerebellar and spinal injuries following chiropractic manipulation. Klingman and Hodges[6] record seven cases of acute ataxia of unknown origin in children, but suggestive of an acute infectious or post-infectious process. However, none of their reports fit into the category of our case of Friedreich's ataxia.

### *Summary*

1. A case of Friedreich's ataxia ascribed to cerebral trauma, with recovery or remission, has been presented.

2. To our knowledge, no previous description in the literature of a case of Friedreich's ataxia, ascribed to cerebral trauma, has been reported.

### *REFERENCES*

1. Wilson, K. S.: Neurology, Baltimore, *Williams & Wilkins Company,* 1940, p. 956.
2. St. Thieffrey, M. Ch., and Arthius, M.: L'ataxie Cerebelleuse Aigue Curable de L'enfant. *Arch. Franc. Pediat.,* 10:14-25, 1953.
3. Shanks, R. A.: Notes on Cerebellar Ataxia in Childhood. *Arch. Dis. Childhood,* 25:389-391, 1950.
4. Waldman, A. M.: Acute Cerebellar Ataxia in Children: Report of three cases. *J. Pediat.,* 42:75-79, 1953.
5. Pratt-Thomas, H. R., and Berger, K. E.: Cerebellar and Spinal Injuries After Chiropractic Manipulation. *J.A.M.A.,* 133:600-603, 1947.
6. Klingman, W. O., and Hodges, R. G.: Acute Ataxia of Unknown Origin in Children. *J. Pediat.,* 24:536-543, 1944.

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# Book Reviews

**THE DOCTOR AS A WITNESS: John Evarts Tracy, Prof. of Law (Emeritus), University of Michigan. Cloth. Pp. 221; $4.25; W. B. Saunders Company, Philadelphia, Penna. 1957.**

The medical man's obligations concern themselves with many and involved phases of legal responsibilities in respect of his patient as well as those related to the particular locality whereat he engages in his professional practice. The physician would do well to acquire a working knowledge respecting the practical aspects of legal principles and their interrelations with the many-sided phases of the medical art in order to avoid the contingencies of involvement in legal breaches.

The application of the distinguishing propositions of law requires an understanding of the principles governing the physician's conduct, action and procedures where medical comportment presupposes conformity with the law. Because his interests are in reciprocal relation to medicolegal principles which embrace his peculiar duties, responsibilities and questions of privilege, the medical man can contribute in considerable measure toward the administration of justice as well as toward his own functions by becoming conversant with medicolegal fundamentals should he ever be called upon to serve as a witness in a legal proceeding.

The book expertly depicts right and wrong methods of presenting medical testimony, is interestingly written in untechnical language and provides a well integrated understanding of the intricacies where

the physician's role is in issue. To name but a few of the principles dealt with, are: the various capacities in which the doctor may be required to testify; waiver of privilege; advice on the handling of hypothetical questions; diverse proceedings where insanity may be an issue; the legal basis for an action for malpractice; use of notes while on the witness stand; and other associated functions where the physician's role becomes a material issue in a legal proceeding.

*Lewis J. Siegal, M.D., LL.B.*

**PSYCHOBIOLOGY by Adolf Meyer. Editors, E. E. Winters and A. M. Bowers. Charles C. Thomas, Springfield, Ill. Pp. 257.**

The Thomas William Salmon Memorial Lectureship was established in 1931 under the aegis of the New York Academy of Medicine. It was inaugurated as an affectionate tribute to Doctor Salmon, whose "supremely noble and useful life" and extraordinary career was cut short by his untimely death in 1927. The unanimous choice of the lecture committee for the honor of initiating the lecture series was Professor Adolf Meyer. The first lectures were given in April, 1932, and this book is a record of them.

In some ways the quarter century delay in the appearance of this work is opportune, for, as it appeared, Doctor Meyer himself was being memorialized. In September, 1957, a plaque in his honor, gift of his devoted pupils and friends was unveiled in the lecture room of the Anstalt Burgholzli, famous old Swiss Contonal Hospital, scene of Meyer's former labors and near to the town of his birth. Incidentally, the setting for the presentation was touching; it was reminiscent of Meyer himself; it was simple, humble and completely sincere.

The book does not suffer by its long gestation period and delayed nativity. Meyer had revised and re-revised the manuscript and two of his devoted associates, the Misses Winters and Bowers, compiled the finished product from an abundant amount of material from his files.

No book or lecture by or about Doctor Meyer could be easy reading and this one is no exception. It consists of three lectures entitled (a) Psychobiology; (b) Pathology; and (c) Therapy. An excellent appendix and bibliography covering 59 pages amplifies the body of the work. It explains and simplifies Meyerian terminology and gives the source of the quotations and bibliographic material which Doctor Meyer uses in his lectures.

It is obviously impossible to go into detail regarding the contents of these lectures in the short space of this review. One is constantly tempted to quote paragraphs from each of them, for the thought strikes one throughout that many of the things which Dctor Meyer taught are today painfully being rediscovered.

Both editors and publishers are to be congratulated and the book is well worth having. As the editors note, the committee was wise in accepting this delayed offering of the distinguished professor, not only because it completes the Salmon Lecture series, but also because: "It is right that the historian should be given the opportunity to evaluate the radical and invigorating views of a man of Meyer's intellectual and scientific stature with all of the pioneer work in hospital organization to his credit."

It is a pleasure to recommend these lectures. They bespeak the thoughts and the hopes of a man ahead of his time and one who felt strongly that the physician "has a responsibility to add to the hygiene of the 'body' a scientific conscience about 'mind.' "

*Francis J. Braceland, M.D.*

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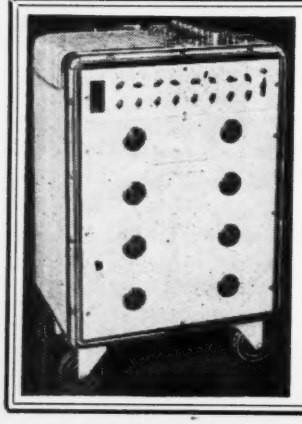

# GARCEAU ELECTROENCEPHALOGRAPHS

**EIGHT-CHANNEL GARCEAU EEG**
Dimensions:
26 x 19 x 40 inches

**No Batteries - A. C. Operated**
**Inkless Writing - Require No Shielding - Shipped Ready to Run**
**Prompt Delivery**

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**SOUTH WOODSTOCK 5 - VERMONT - U. S. A.**
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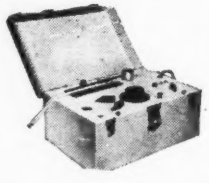

**JUNIOR GARCEAU EEG**
Dimensions:
18 x 12 x 9 inches

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